

# PARTS CATALOG

FOR



## ELECTRIC GENERATING PLANTS

# HC

## SERIES

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**ONAN**

2515 UNIVERSITY AVE. S.E. • MINNEAPOLIS, MINNESOTA 55414

A DIVISION OF STUDEBAKER CORPORATION

IN CANADA: ONAN GENERATORS CANADA LTD., POST OFFICE BOX 652, GUELPH, ONTARIO  
INTERNATIONAL DISTRICT OFFICE: EMPIRE STATE BLDG., 350-5TH AVE., RM. 2204, NEW YORK 10001



# Important Safety Precautions

Read and observe these safety precautions when using or working on electric generators, engines and related equipment. Also read and follow the literature provided with the equipment.

Proper operation and maintenance are critical to performance and safety. Electricity, fuel, exhaust, moving parts and batteries present hazards that can cause severe personal injury or death.

## FUEL, ENGINE OIL, AND FUMES ARE FLAMMABLE AND TOXIC

Fire, explosion, and personal injury can result from improper practices.

- Used engine oil, and benzene and lead, found in some gasoline, have been identified by government agencies as causing cancer or reproductive toxicity. When checking, draining or adding fuel or oil, do not ingest, breathe the fumes, or contact gasoline or used oil.
- Do not fill tanks with engine running. Do not smoke around the area. Wipe up oil or fuel spills. Do not leave rags in engine compartment or on equipment. Keep this and surrounding area clean.
- Inspect fuel system before each operation and periodically while running.
- Equip fuel supply with a positive fuel shutoff.
- Do not store or transport equipment with fuel in tank.
- Keep an ABC-rated fire extinguisher available near equipment and adjacent areas for use on all types of fires except alcohol.
- Unless provided with equipment or noted otherwise in installation manual, fuel lines must be copper or steel, secured, free of leaks and separated or shielded from electrical wiring.
- Use approved, non-conductive flexible fuel hose for fuel connections. Do not use copper tubing as a flexible connection. It will work-harden and break.

## EXHAUST GAS IS DEADLY

- Engine exhaust contains carbon monoxide (CO), an odorless, invisible, poisonous gas. Learn the symptoms of CO poisoning.
- Never sleep in a vessel, vehicle, or room with a genset or engine running unless the area is equipped with an operating CO detector with an audible alarm.
- Each time the engine or genset is started, or at least every day, thoroughly inspect the exhaust system. Shut down the unit and repair leaks immediately.

- Warning: Engine exhaust is known to the State of California to cause cancer, birth defects and other reproductive harm.

*Make sure exhaust is properly ventilated.*

- Vessel bilge must have an operating power exhaust.
- Vehicle exhaust system must extend beyond vehicle perimeter and not near windows, doors or vents.
- Do not use engine or genset cooling air to heat an area.
- Do not operate engine/genset in enclosed area without ample fresh air ventilation.
- Expel exhaust away from enclosed, sheltered, or occupied areas.
- Make sure exhaust system components are securely fastened and not warped.

## MOVING PARTS CAN CAUSE SEVERE PERSONAL INJURY OR DEATH

- Do not remove any guards or covers with the equipment running.
- Keep hands, clothing, hair, and jewelry away from moving parts.
- Before performing any maintenance, disconnect battery (negative [-] cable first) to prevent accidental starting.
- Make sure fasteners and joints are secure. Tighten supports and clamps, keep guards in position over fans, drive belts, etc.
- If adjustments must be made while equipment is running, use extreme caution around hot manifolds and moving parts, etc. Wear safety glasses and protective clothing.

## BATTERY GAS IS EXPLOSIVE

- Wear safety glasses and do not smoke while servicing batteries.
- Always disconnect battery negative (-) lead first and reconnect it last. Make sure you connect battery correctly. A direct short across battery terminals can cause an explosion. Do not smoke while servicing batteries. Hydrogen gas given off during charging is explosive.
- Do not disconnect or connect battery cables if fuel vapors are present. Ventilate the area thoroughly.

## **DO NOT OPERATE IN FLAMMABLE AND EXPLOSIVE ENVIRONMENTS**

Flammable vapor can be ignited by equipment operation or cause a diesel engine to overspeed and become difficult to stop, resulting in possible fire, explosion, severe personal injury and death. **Do not operate diesel equipment where a flammable vapor environment can be created by fuel spill, leak, etc., unless equipped with an automatic safety device to block the air intake and stop the engine.**

## **HOT COOLANT CAN CAUSE SEVERE PERSONAL INJURY**

- Hot coolant is under pressure. Do not loosen the coolant pressure cap while the engine is hot. Let the engine cool before opening the pressure cap.

## **ELECTRICAL SHOCK CAN CAUSE SEVERE PERSONAL INJURY OR DEATH**

- Do not service control panel or engine with unit running. High voltages are present. Work that must be done while unit is running should be done only by qualified service personnel.
- Do not connect the generator set to the public utility or to any other electrical power system. Electrocutation can occur at a remote site where line or equipment repairs are being made. An approved transfer switch must be used if more than one power source is connected.
- Disconnect starting battery (negative [-] cable first) before removing protective shields or touching electrical equipment. Use insulative mats placed on dry wood platforms. Do not wear jewelry, damp clothing or allow skin surface to be damp when handling electrical equipment.
- Use insulated tools. Do not tamper with interlocks.
- Follow all applicable state and local electrical codes. Have all electrical installations performed by a qualified licensed electrician. Tag open switches to avoid accidental closure.
- With transfer switches, keep cabinet closed and locked. Only authorized personnel should have cabinet or operational keys. Due to serious shock hazard from high voltages within cabinet, all service and adjustments must be performed by an electrician or authorized service representative.

If the cabinet must be opened for any reason:

1. Move genset operation switch or Stop/Auto/Handcrank switch (whichever applies) to Stop.
2. Disconnect genset batteries (negative [-] lead first).
3. Remove AC power to automatic transfer switch. If instructions require otherwise, use extreme caution due to shock hazard.

## **MEDIUM VOLTAGE GENERATOR SETS (601V TO 15kV)**

- Medium voltage acts differently than low voltage. Special equipment and training are required to work on or around medium voltage equipment. Operation and maintenance must be done only by persons trained and qualified to work on such devices. Improper use or procedures will result in severe personal injury or death.
- Do not work on energized equipment. Unauthorized personnel must not be permitted near energized equipment. Induced voltage remains even after equipment is disconnected from the power source. Plan maintenance with authorized personnel so equipment can be de-energized and safely grounded.

## **GENERAL SAFETY PRECAUTIONS**

- Do not work on equipment when mentally or physically fatigued or after consuming alcohol or drugs.
- Carefully follow all applicable local, state and federal codes.
- Never step on equipment (as when entering or leaving the engine compartment). It can stress and break unit components, possibly resulting in dangerous operating conditions from leaking fuel, leaking exhaust fumes, etc.
- Keep equipment and area clean. Oil, grease, dirt, or stowed gear can cause fire or damage equipment by restricting airflow.
- Equipment owners and operators are solely responsible for operating equipment safely. Contact your authorized Onan/Cummins dealer or distributor for more information.

**KEEP THIS DOCUMENT NEAR EQUIPMENT FOR EASY REFERENCE.**

# INSTRUCTIONS FOR ORDERING REPAIR PARTS

1

FOR PARTS OR SERVICE, CONTACT THE DEALER FROM WHOM YOU PURCHASED THIS EQUIPMENT OR REFER TO YOUR NEAREST AUTHORIZED SERVICE STATION.

TO AVOID ERRORS OR DELAY IN FILLING YOUR PARTS ORDER, PLEASE FURNISH ALL INFORMATION REQUESTED.

REFER TO THE NAMEPLATE ON YOUR PLANT

1. Always give the MODEL & SPEC. NO. and SERIAL NO.

ELECTRIC **ONAN** PLAN

MODEL AND SPECIFICATION NO. SERIAL NO.

**IMPORTANT** MENTION ABOVE NUMBERS AND GEN DATA NO. WHEN ORDERING PARTS OR WRITING ABOUT THE PLANT.

RATINGS AT SEA LEVEL BASED ON FUEL CHECKED BELOW:

GASOLINE DIESEL FUEL

STAND BY KW KVA AMPS

CONTINUOUS KW KVA AMPS

A.C. VOLTS CYCLES PHASE P.F.

EXCITER GEN. DATA

R.P.M. USE VOLT BATTERY-NEGATIVE GROUND

MANUFACTURED BY  
**ONAN**  
MINNEAPOLIS, IA, MINNESOTA  
MADE IN U.S.A.

For handy reference, copy YOUR plant nameplate information in the spaces above.

2. Do not order by reference number or group number, use part number and description.
3. Give the part number, description and quantity needed of each item. If an old part cannot be identified, return the part prepaid to your dealer or nearest AUTHORIZED SERVICE STATION. Print your name and address plainly on the package. Write a letter to the same address stating the reason for returning the part.
4. State definite shipping instructions.

Any claim for loss or damage to your unit in transit should be filed promptly against the transportation company making the delivery. Shipments are complete unless the packing list indicates items are back ordered.

"Prices are purposely omitted from this Parts Catalog due to the confusion resulting from fluctuating costs, import duties, sales taxes, exchange rates, etc.

For Current parts prices, consult your Onan Dealer, Distributor or Parts and Service Center."

"En esta lista de partes los precios se omiten de proposito, ya que bastante confusion resultado de fluctuaciones de los precios, derechos aduanales, impuestos de venta, cambios extranjeros etc.

Consiga los precios vigentes de su distribuidor de productos "ONAN".

# PARTS CATALOG

This Parts Catalog applies to the Onan HC Series electric generating plants.

This complete generating plant is powered by a Continental 4 cylinder engine. Always supply the MODEL, SPEC., and SERIAL NO. of the plant with each inquiry or parts order.

"Left Side" of the complete plant, as designated by the manufacturer, is determined by viewing the plant from the radiator end; for example, the carburetor is on the left side. The radiator is at the "Front End" of the plant.

All part numbers are ONAN numbers except those prefixed as follows: (CO) Continental Motors; (AL) Electric Auto-Lite; (HOF) Hoof Products; (CAR) Carter Carburetor. Many of the prefixed numbers are stocked by ONAN and distributors.

Parts in the main illustrated list apply to the following output voltage plants. In 10,000 watt or 15,000 watt 60 cycle, and in 10,000 watt or 12,000 watt 50 cycle plants:

ELECTRICAL OUTPUT †	BASIC MODEL	
	60 CYCLE	50 CYCLE
120 VOLT, 1 PHASE, 2 WIRE	10 & 15 HC-1R	10 & 12 HC-51R
120/240 VOLT, 1 PHASE, 3 WIRE	10 & 15 HC-3R	10 & 12 HC-53R
120/208 VOLT, 3 PHASE, 4 WIRE	10 & 15 HC-4R	10 & 12 HC-54R
120/240 VOLT, 3 PHASE, 4 WIRE	10 & 15 HC-5DR	10 & 12 HC-55DR
240 VOLT, 3 PHASE, 3 WIRE	10 & 15 HC-5R	10 & 12 HC-55R
480 VOLT, 3 PHASE, 3 WIRE	10 & 15 HC-6R	10 & 12 HC-56R
220/380 VOLT, 3 PHASE, 4 WIRE	10 & 15 HC-7R	10 & 12 HC-57R
120/240 VOLT, 1 PHASE, 3 WIRE	▲10 HC-3R17	▲10 HC-53R17

† - Reference to 120, 120/240, 240 and 480 Volt also applies to 115, 115/230, 230 and 460 Volt.

▲ - X-Ray Models.

## PENNSYLVANIA APPROVED FOR EMERGENCY STANDBY SERVICE

The Commonwealth of Pennsylvania has established requirements for standby generating plants which necessitate the use of special parts on plants operated within that state. The parts contained in that section of the catalog apply to the Onan HC Series PENNSYLVANIA APPROVED Generating Plants, which can be identified by the specification numbers 30 (Gasoline), 31 (Natural Gas), and 131 (L.P.G.), depending on the type of fuel used for internal combustion, either immediately before or after the diagonal in the Model and Specification number. If relevant, refer to the special section, pages 53 thru 55, before consulting the main section.

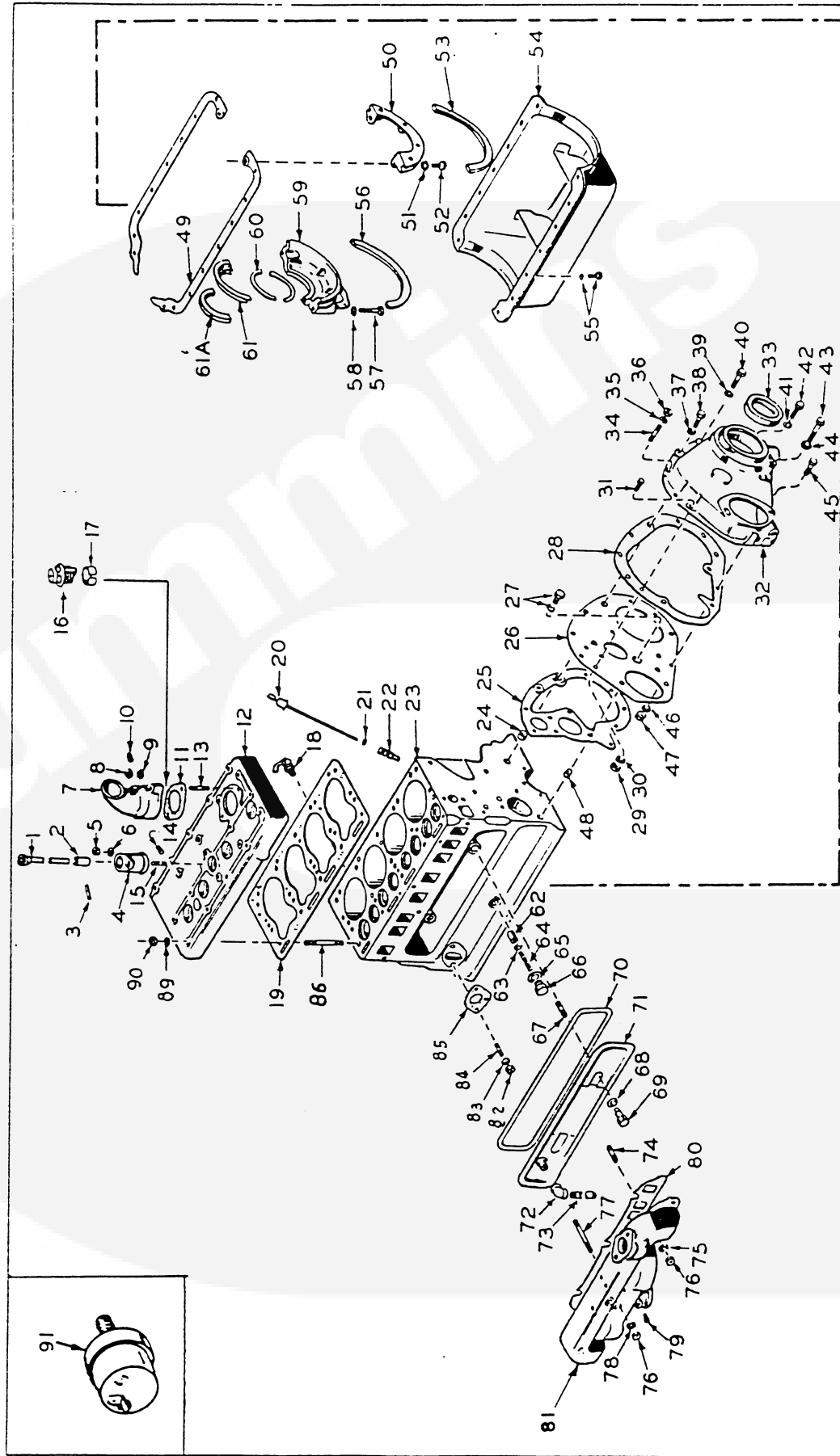


FIG.1 - EXTERNAL VIEW ENGINE PARTS GROUP

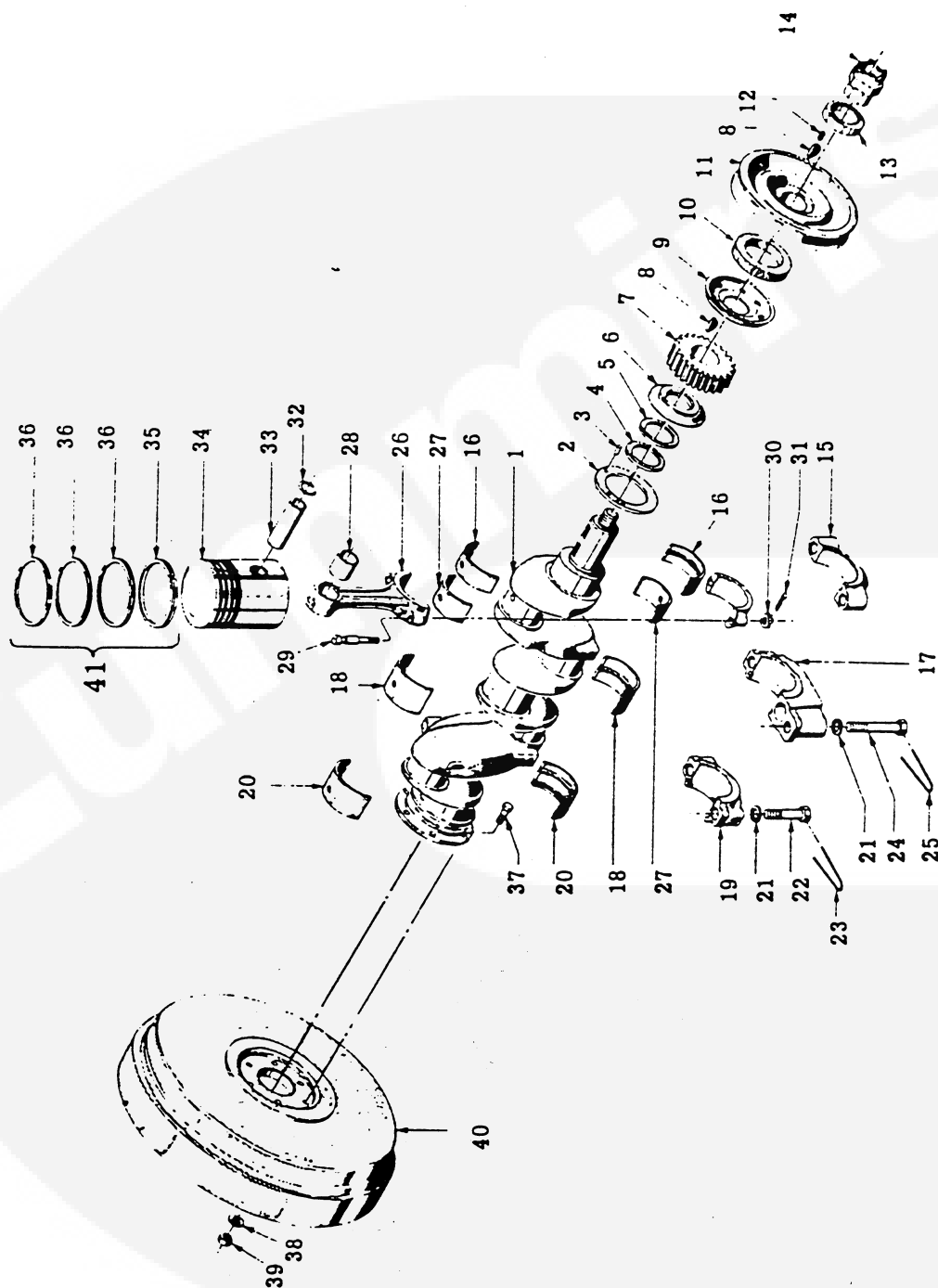


FIG. 2 - INTERNAL VIEW ENGINE PARTS GROUP



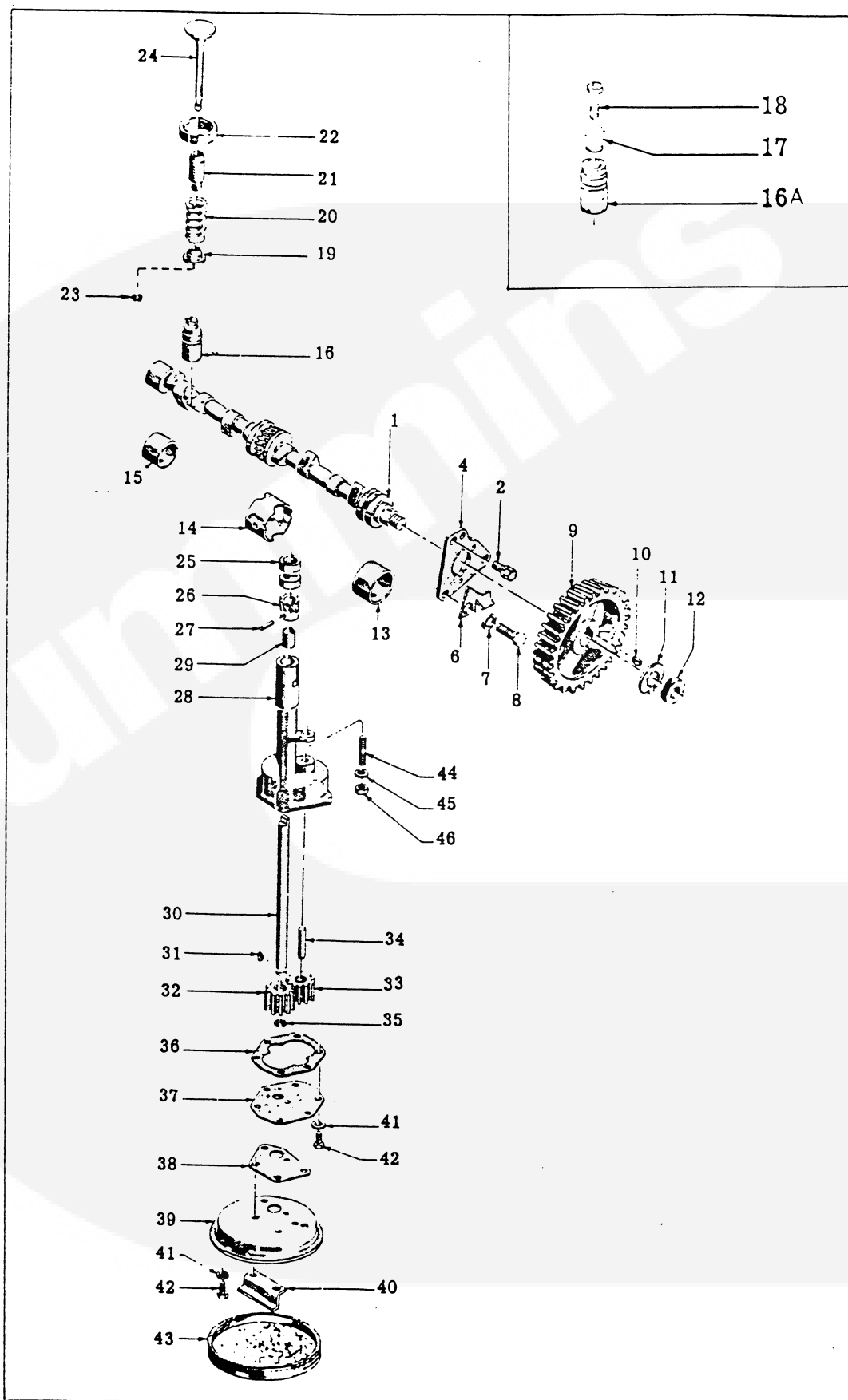


FIG. 3 - CAMSHAFT & OIL PUMP PARTS GROUP

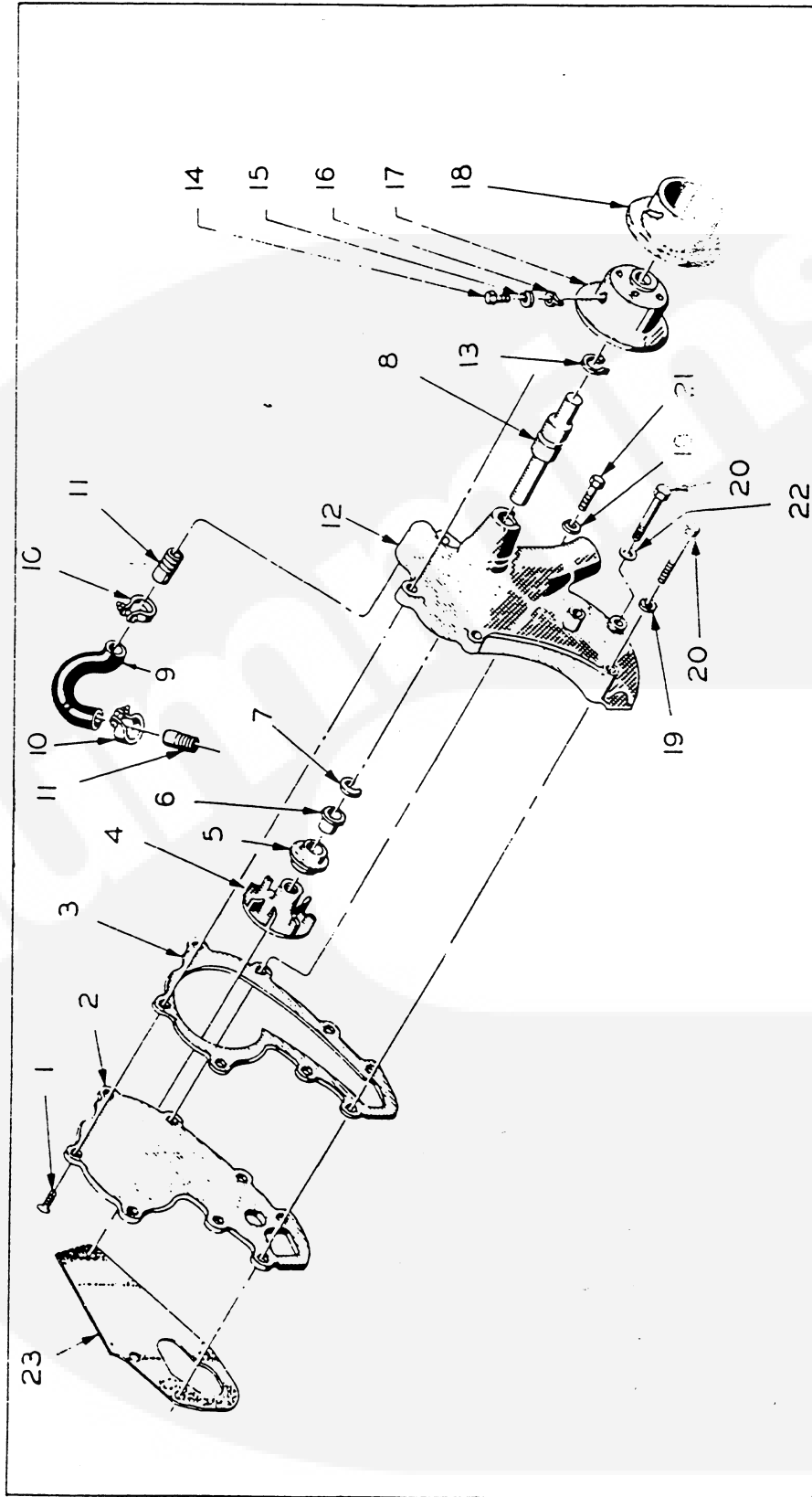


FIG. 4 - WATER PUMP PARTS GROUP

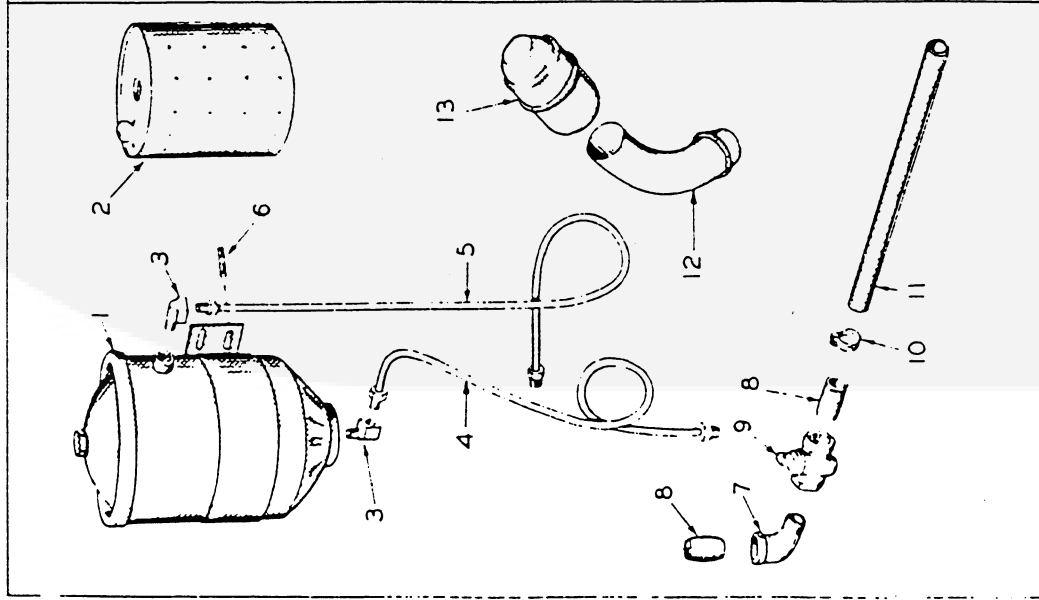


FIG. 5 - OIL SYSTEM GROUP

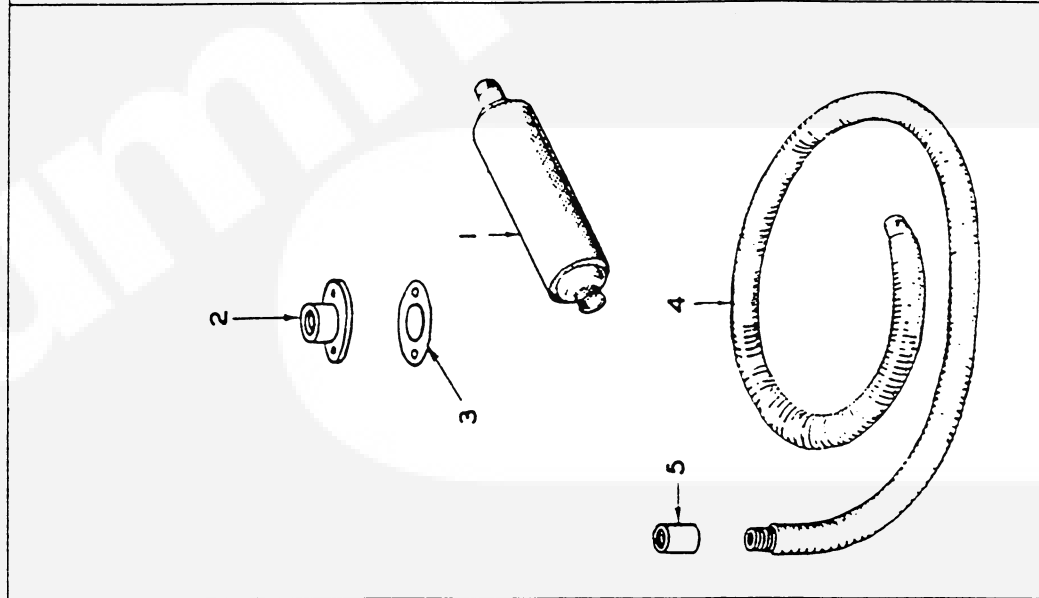


FIG. 6 - MUFFLER GROUP

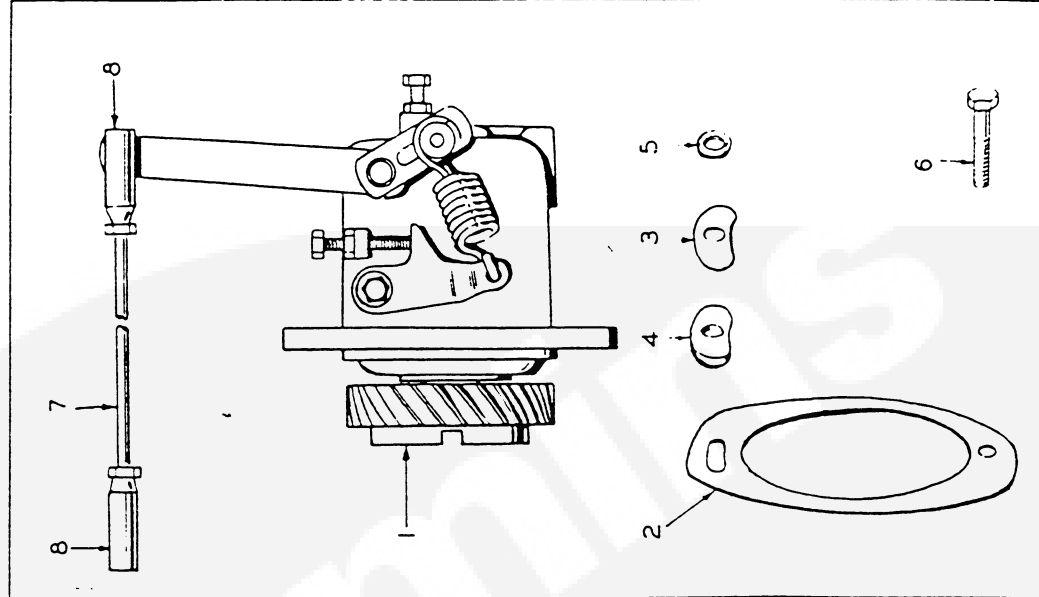


FIG. 7 - GOV. & LINKAGE GROUP

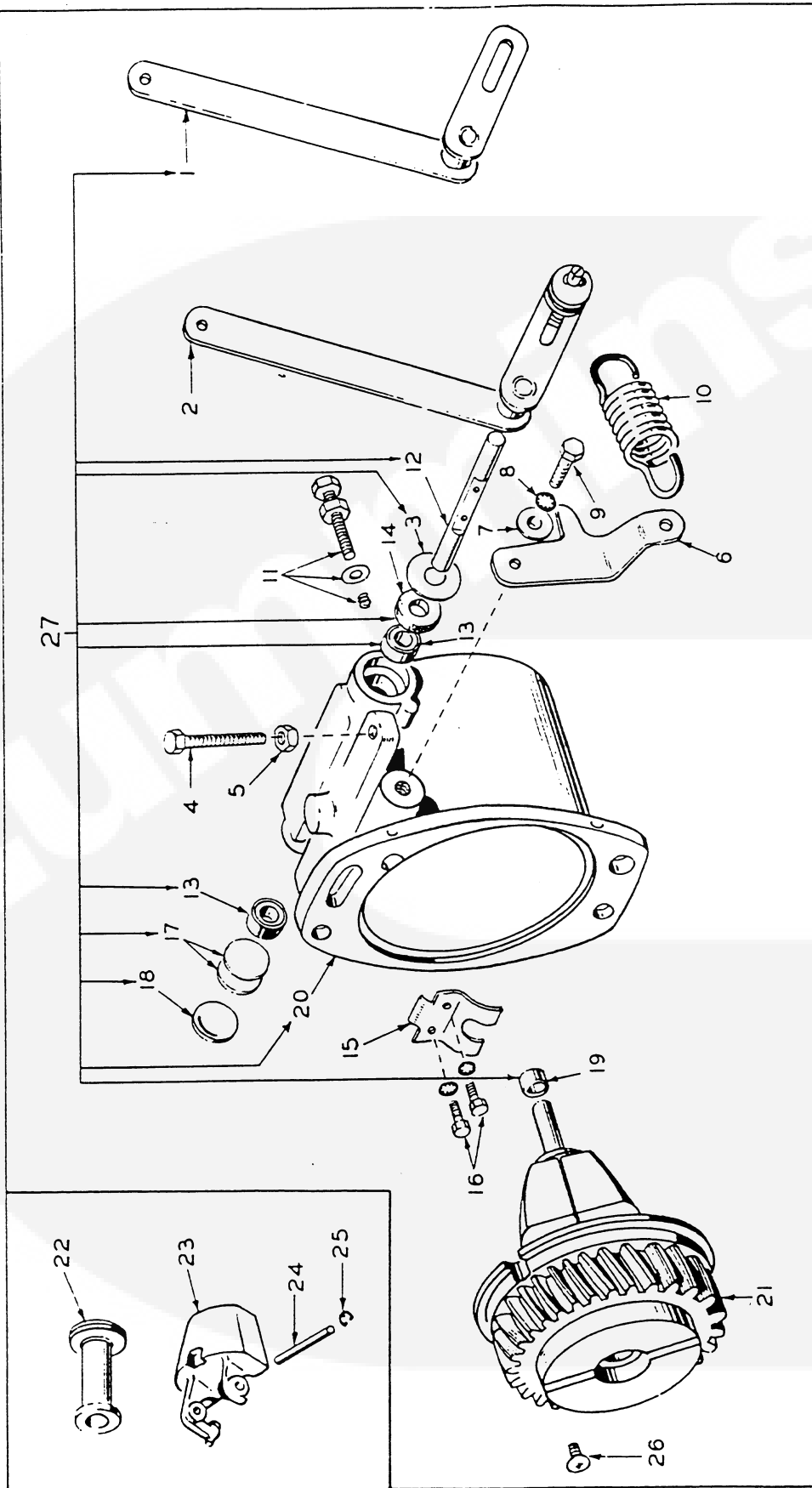


FIG. 8 - GOVERNOR PARTS GROUP

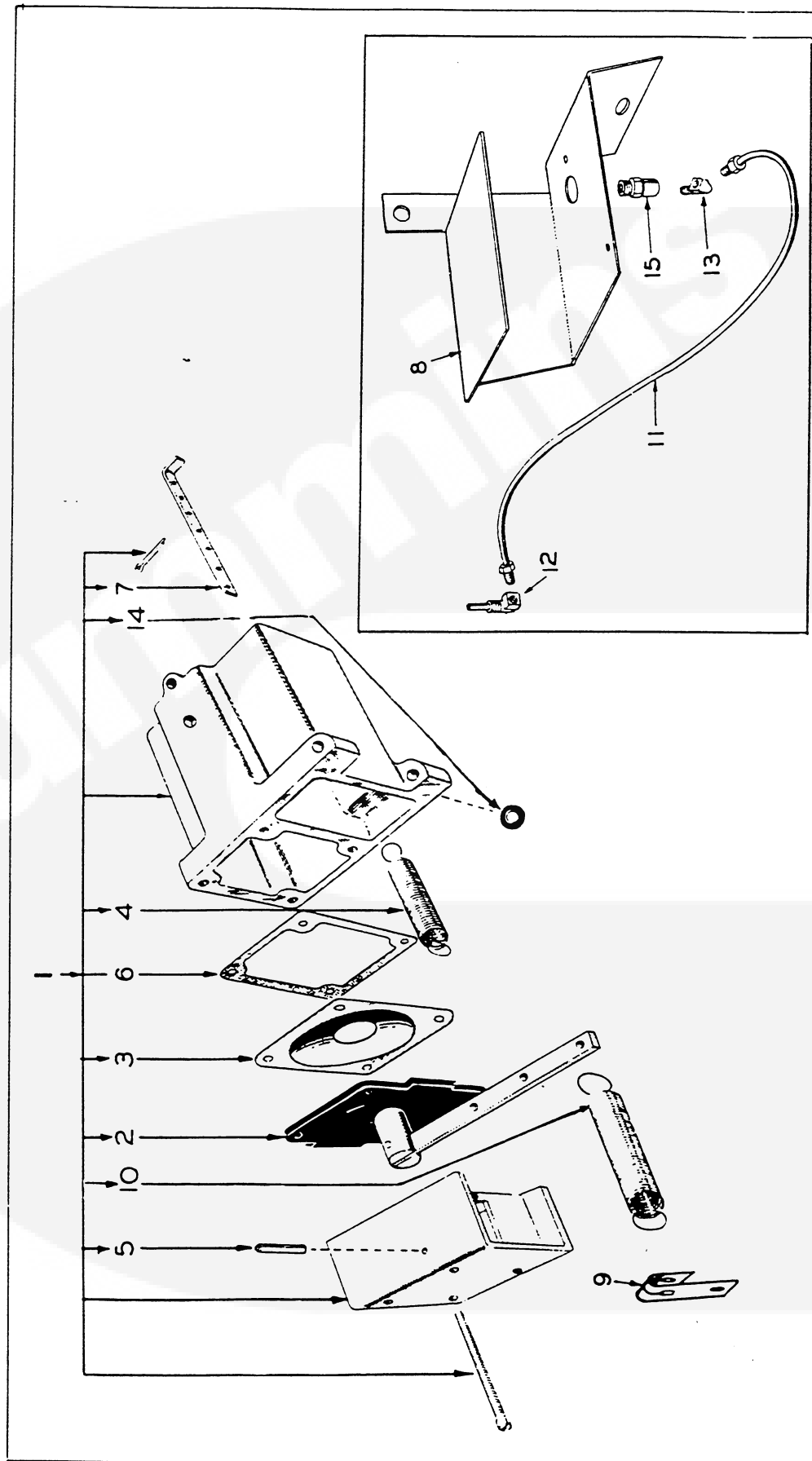


FIG. 9 - VACUUM BOOSTER GROUP

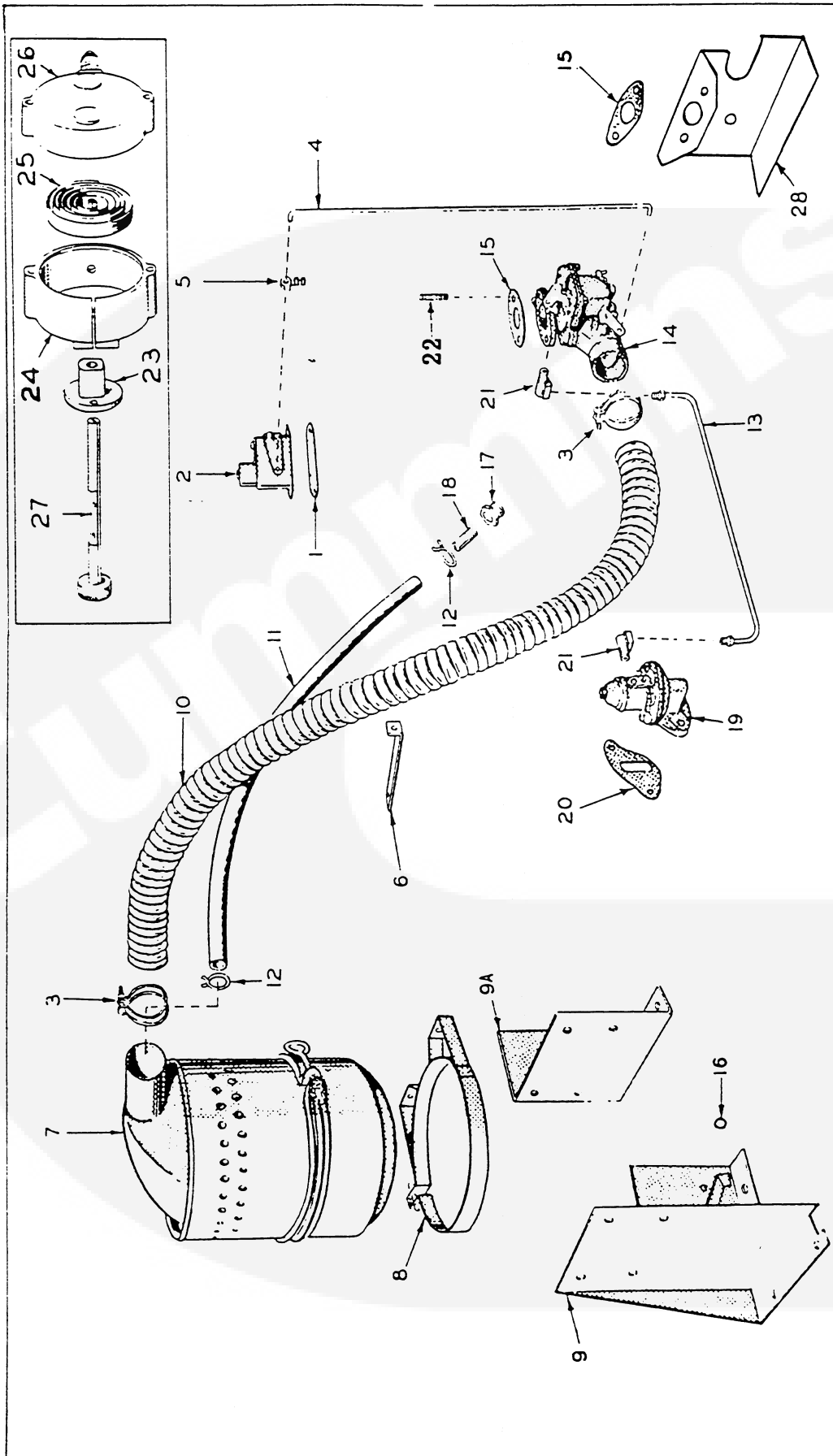


FIG. 10 - FUEL SYSTEM GROUP (GASOLINE)

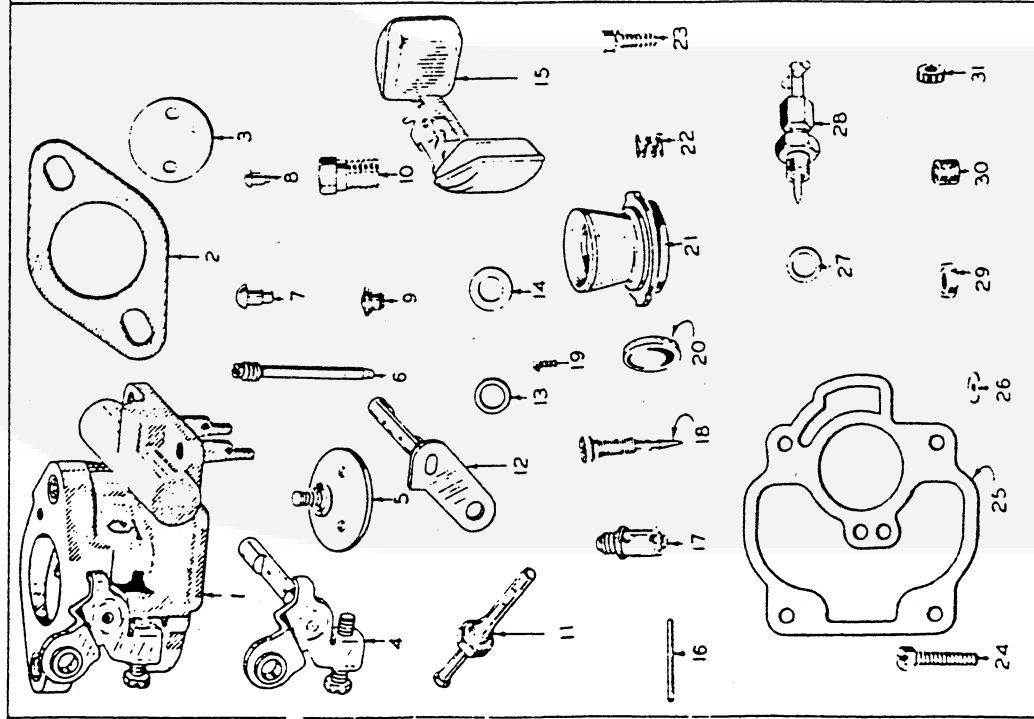


FIG. 11 - CARBURETOR PARTS GROUP

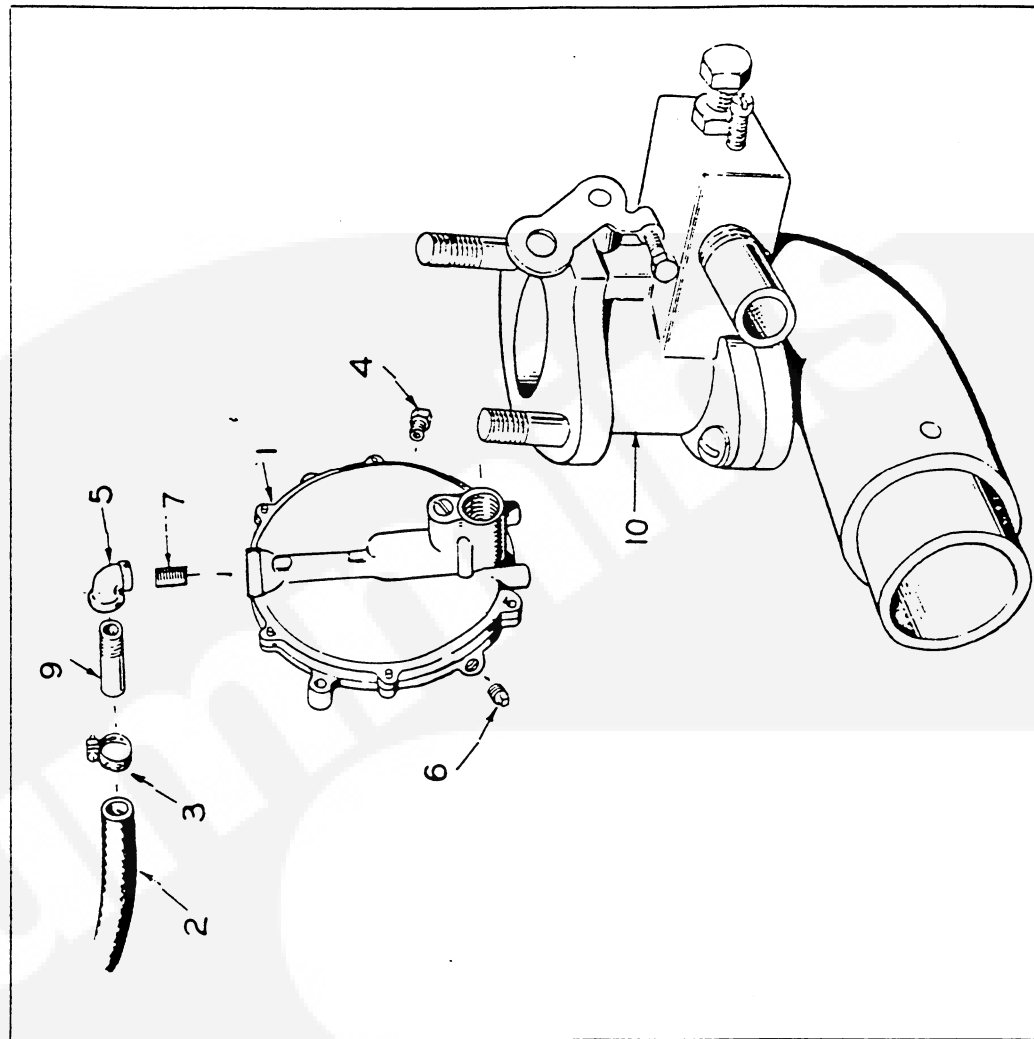


FIG. 12 - FUEL SYSTEM GROUP (GAS ONLY)

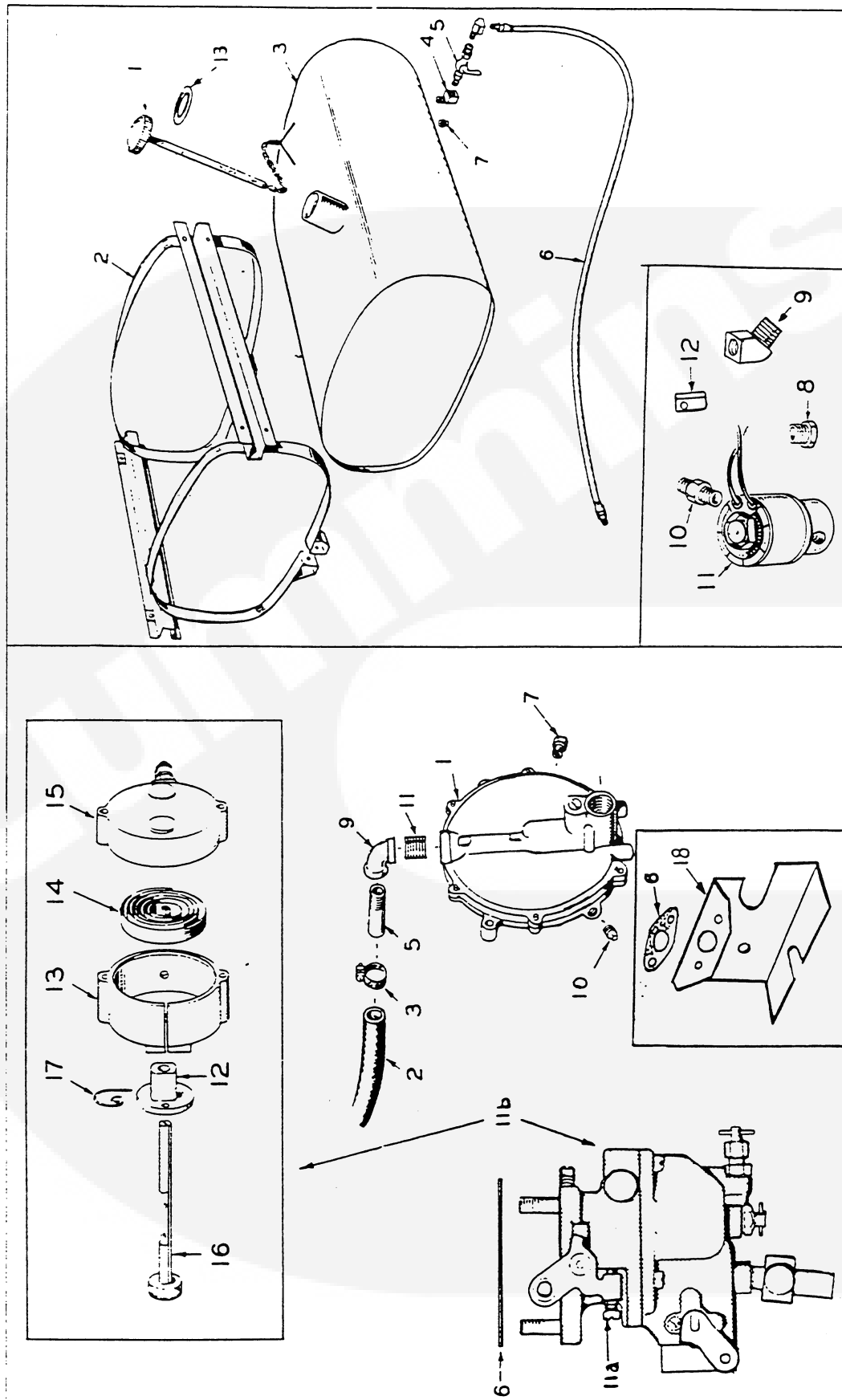


FIG. 13 - FUEL SYSTEM GROUP (GAS-GASOLINE)

FIG. 14 - MOUNTED FUEL TANK GROUP



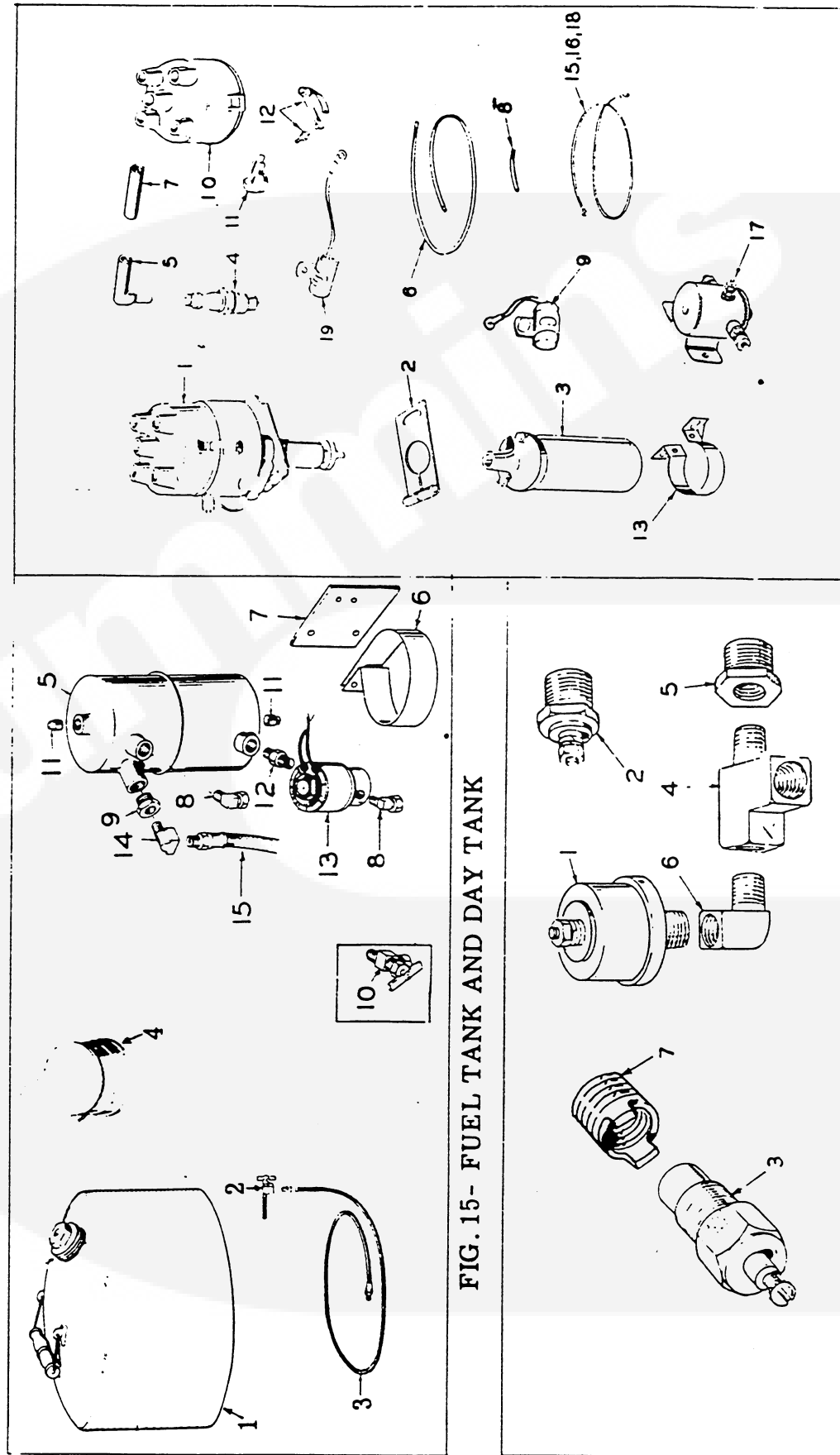


FIG. 17 - BATTERY IGNITION GROUP 13

FIG. 16- WATER AND OIL SENDER GROUP

FIG. 15- FUEL TANK AND DAY TANK

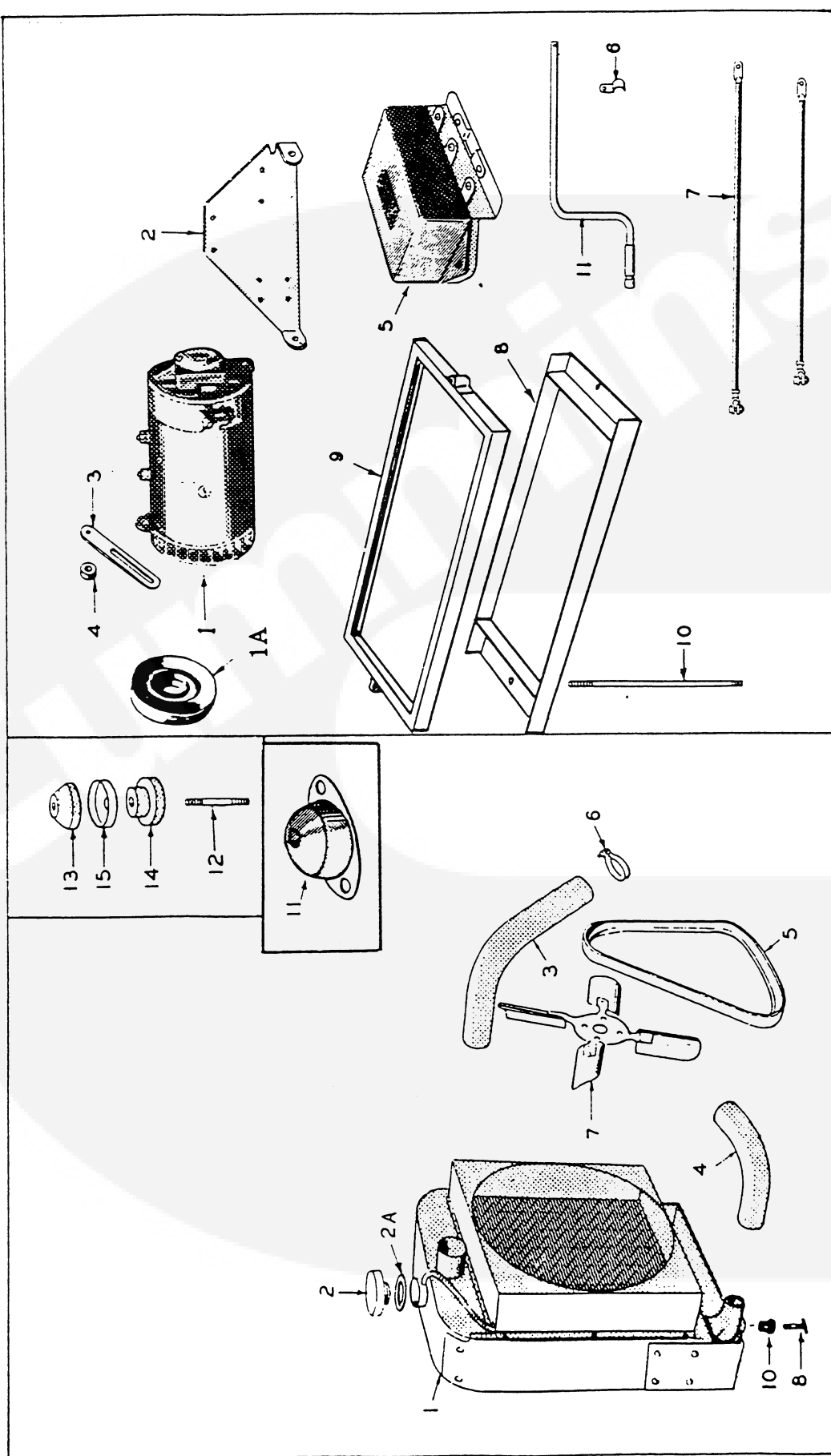


FIG. 19 - CHARGING GENERATOR GROUP

FIG. 18 - COOLING &amp; MOUNTING CUSHION GROUP

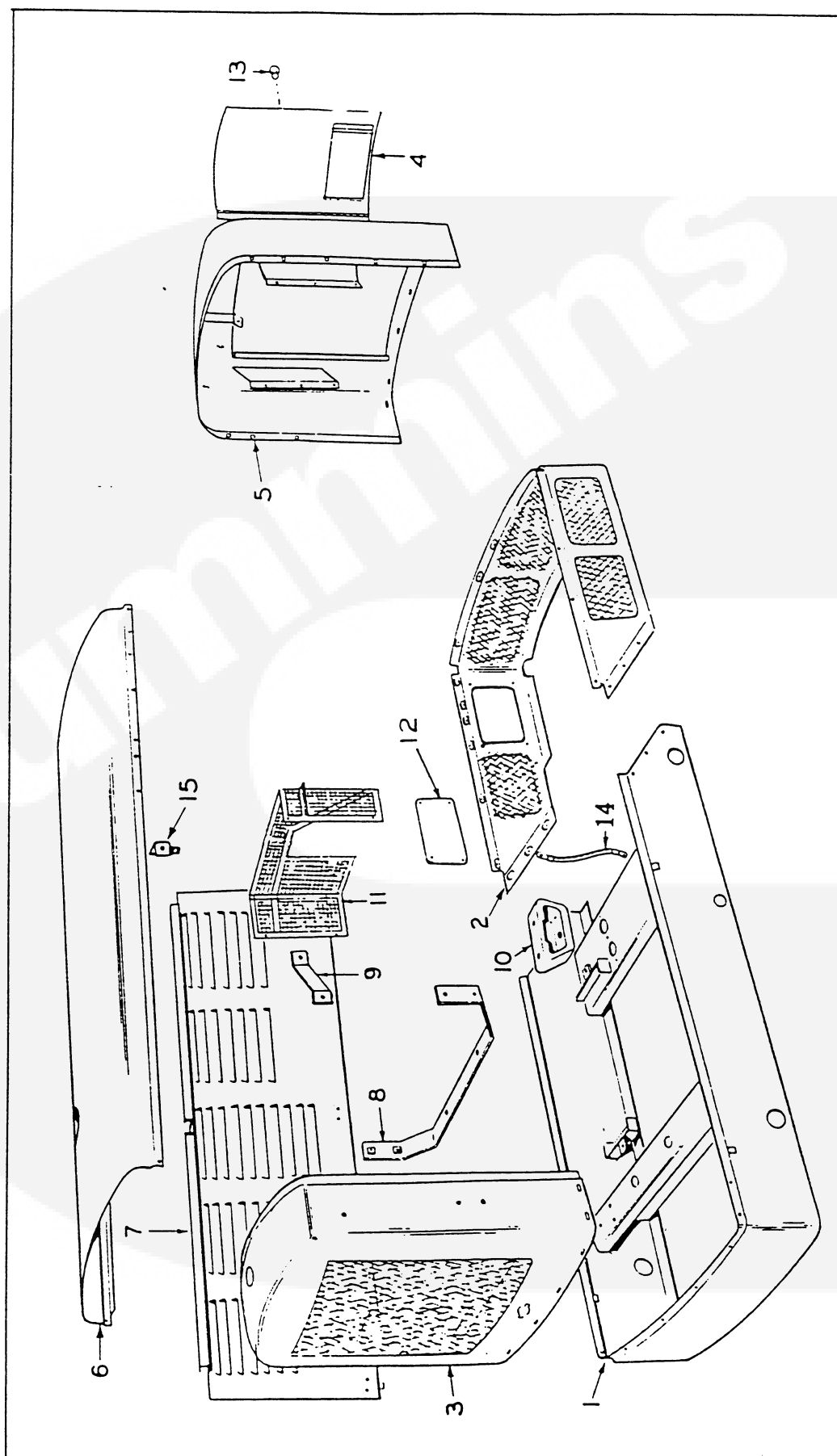


FIG. 20 - HOUSING GROUP (HOUSED PLANTS ONLY)

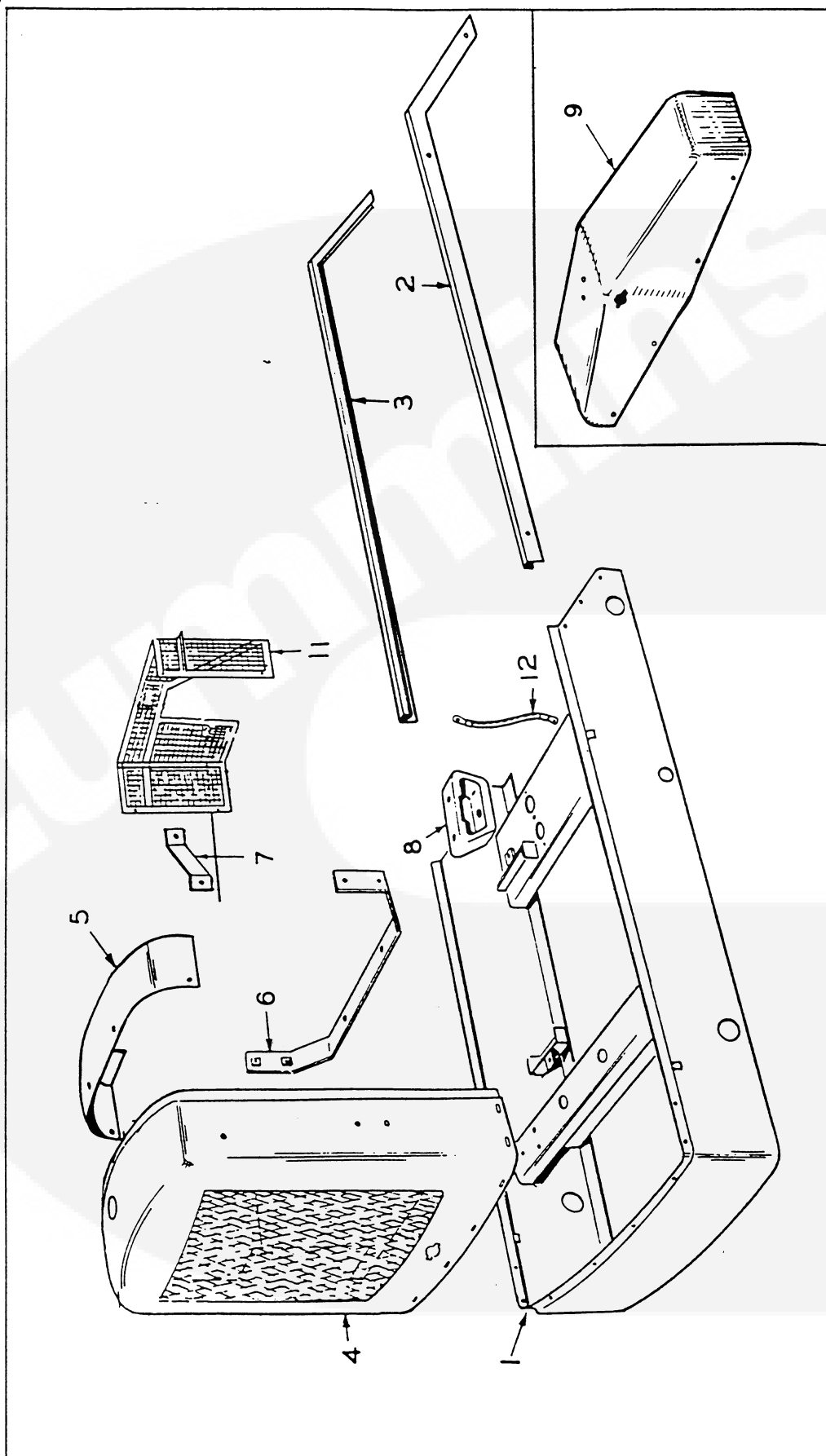


FIG. 21 - MOUNTING GROUP (UNHOUSED PLANTS ONLY)

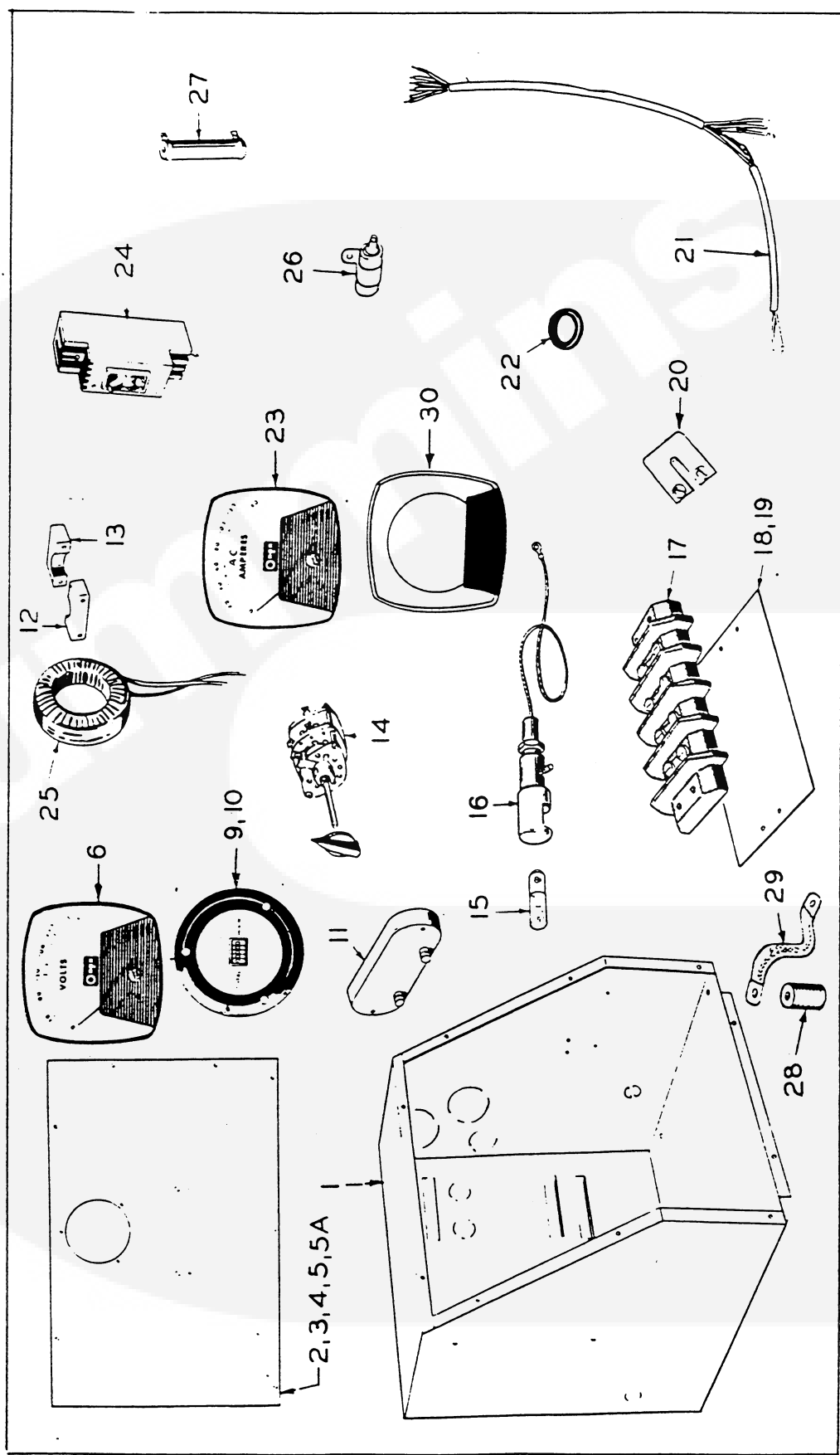


FIG. 22 - ELECTRICAL CONTROL GROUP (HOUSED ONLY)

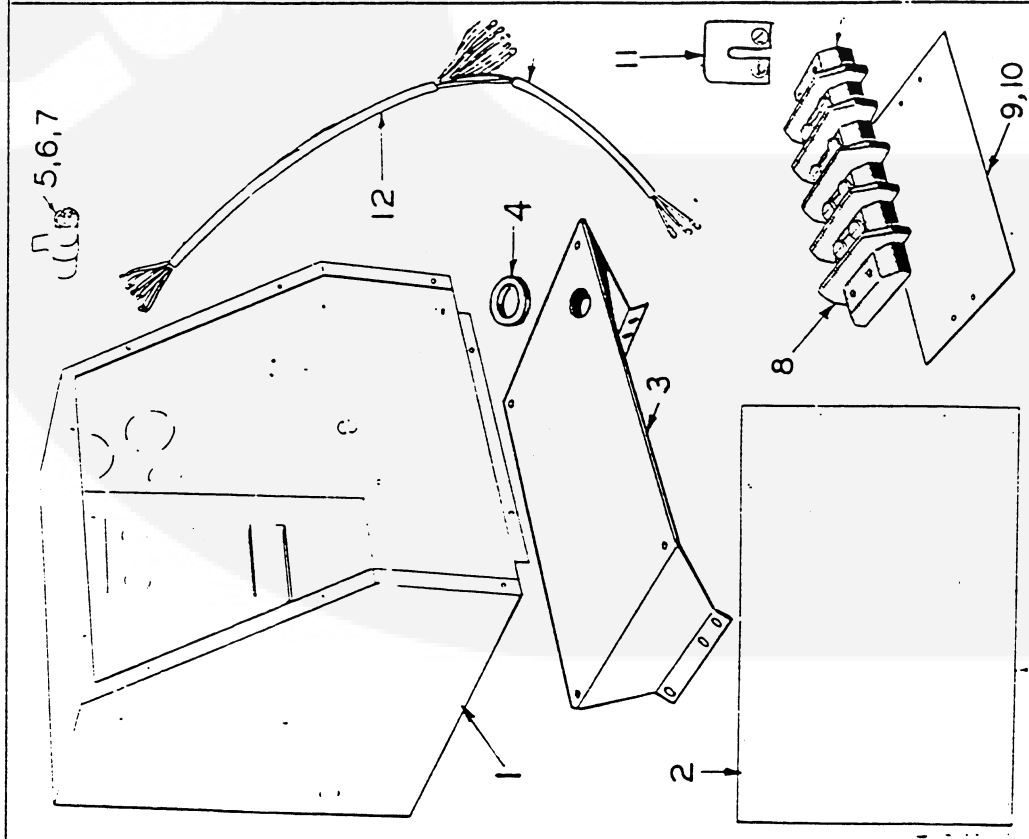


FIG. 23 - ELECTRICAL CONTROL GROUP  
(UNHOUSED ONLY)

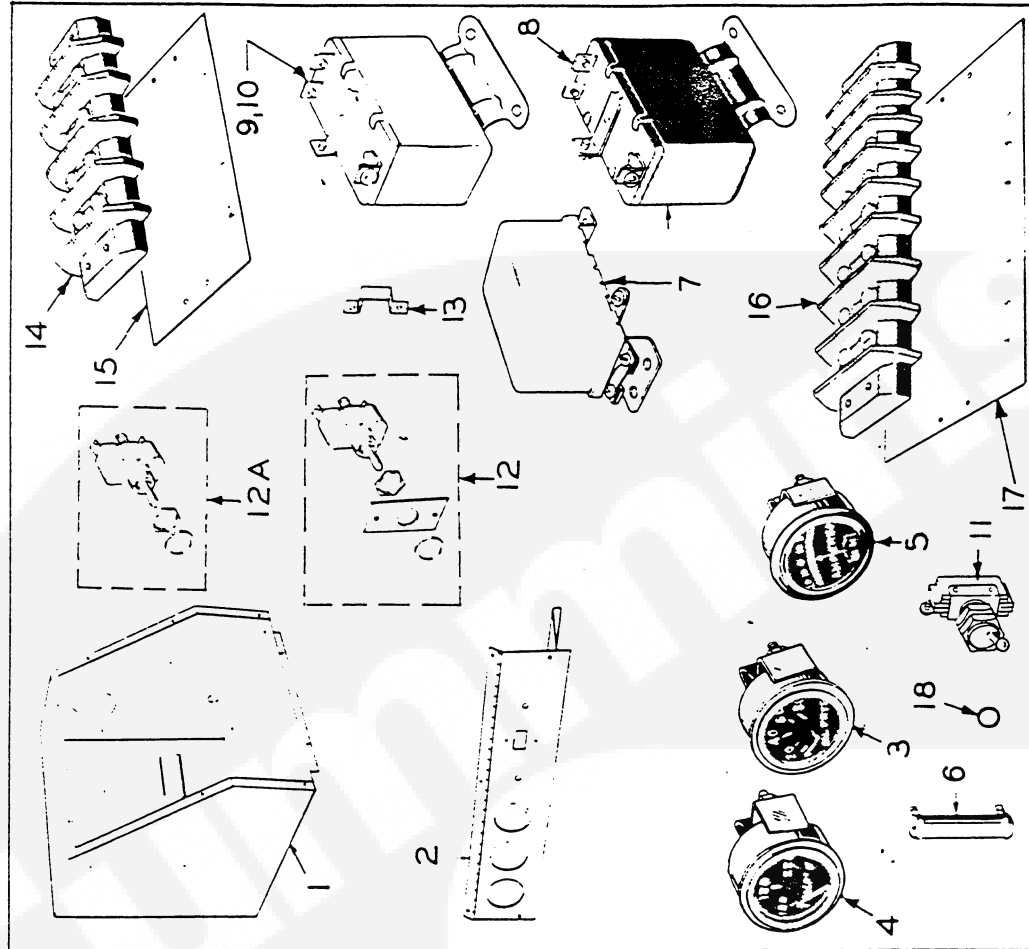


FIG. 24 - ENGINE CONTROL GROUP  
(HOUSED & UNHOUSED)

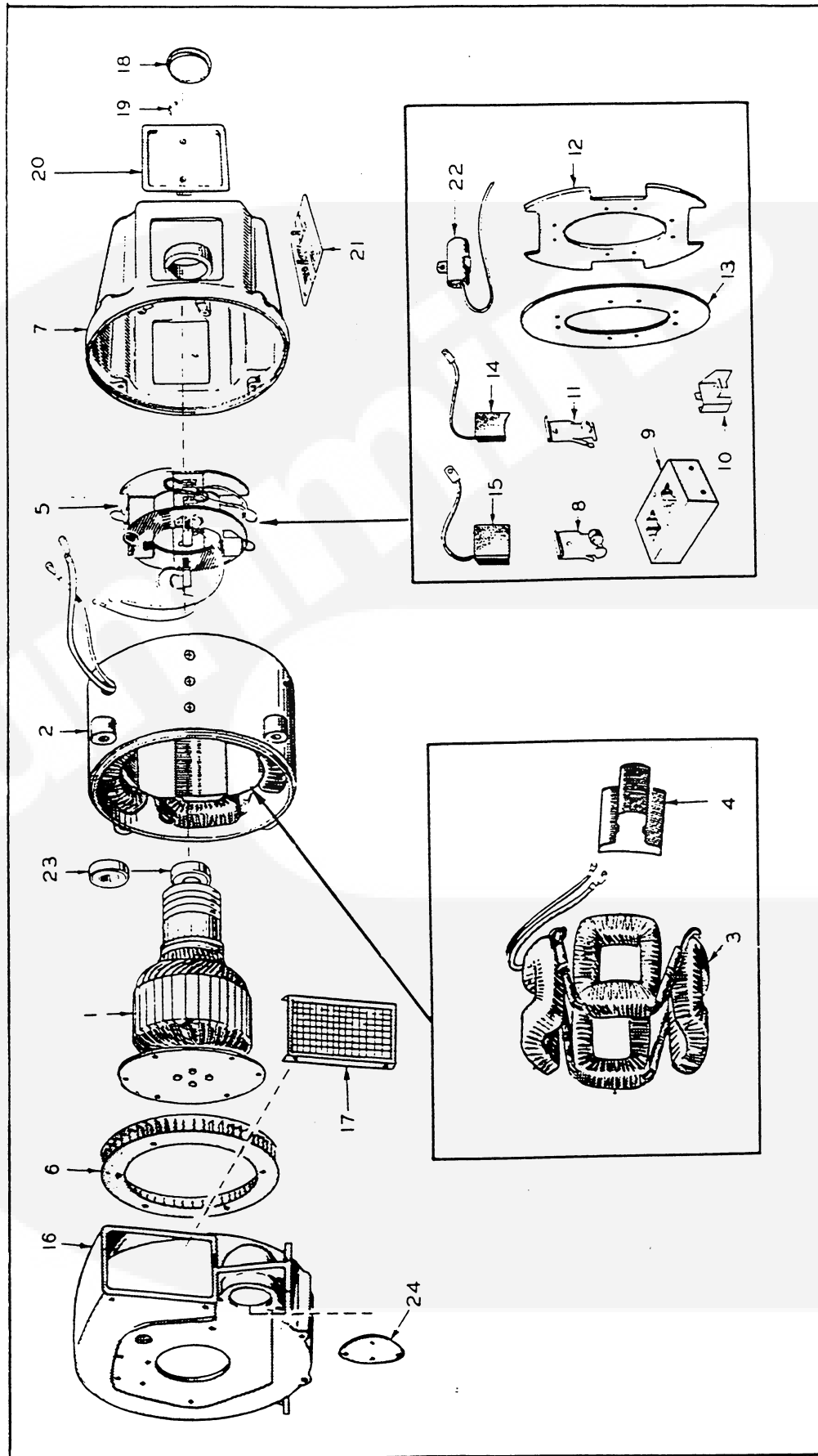


FIG. 25 - GENERATOR GROUP

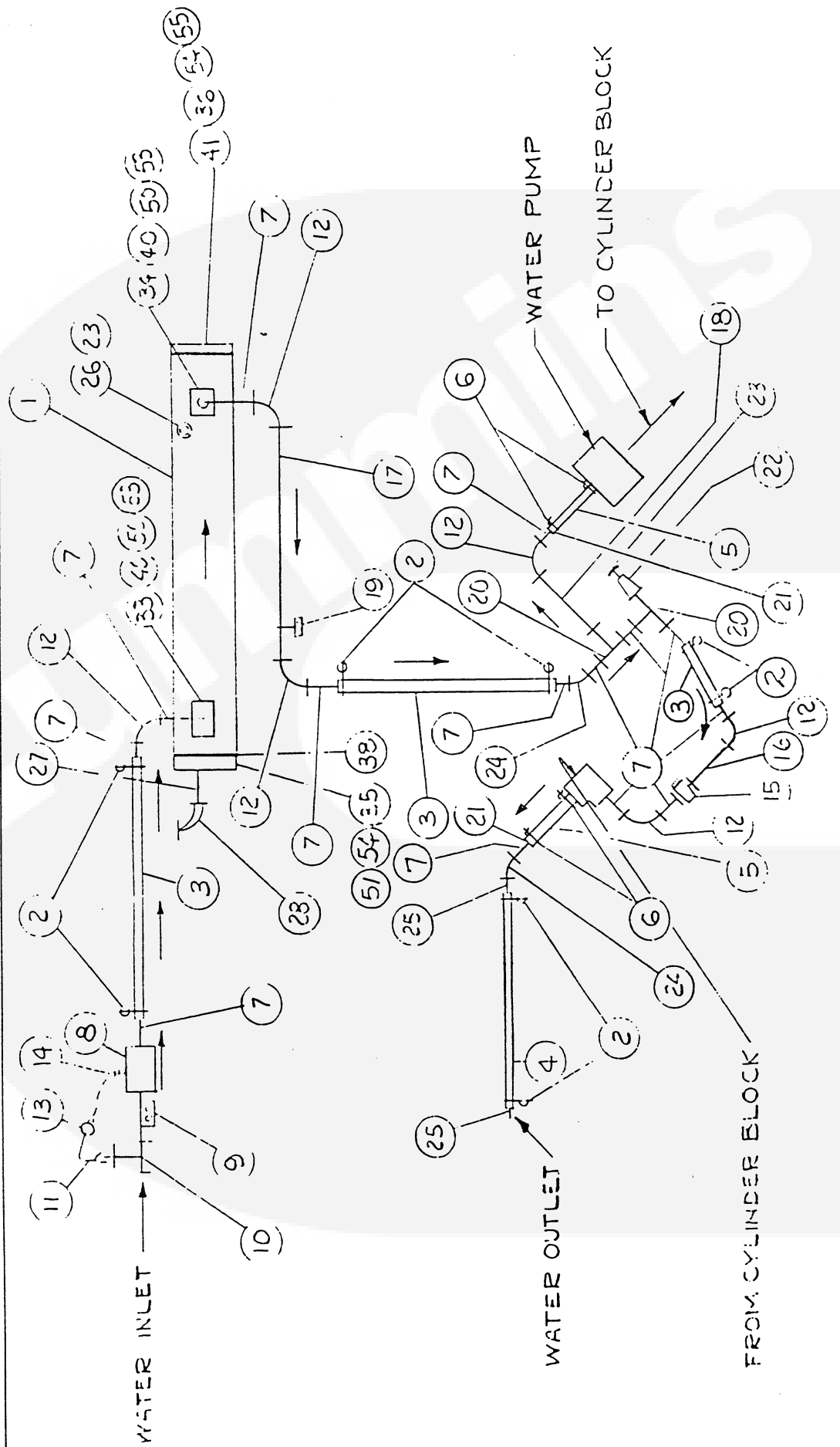


FIG. 26 - CITY WATER COOLING GROUP (Optional Equipment)



## ENGINE

### OVERSIZE AND UNDERSIZE PARTS

If an oversize or undersize part is required, specify the size after the part number and separated with a dash. Example: F162A-230-.003(Oversize)

Sizes other than standard are offered as follows:

NOTE: Only standard size and those sizes below which are marked with an asterisk ( \* ) are stocked by ONAN. Whenever practicable order other sizes directly from your nearest Continental Motors Corp. dealer.

<u>OVERSIZE PISTONS</u>		<u>OVERSIZE PISTON RINGS</u>
<u>Cast Iron</u>	<u>Aluminum</u>	
.010 *	.010	.010 *
.020 *	.020	.020 *
.030 *	.030	.030 *
.040	.040	.040
.050		.060
.060		
S.F. (Semi-Finished)	S.F.	

<u>OVERSIZE PISTON PINS</u>	<u>UNDERSIZE BEARINGS (MAIN &amp; ROD)</u>
.003 *	.002 *
.005	.010
.010	.020 *
	.030
	.040
	.060 (may be reworked to .040)

<u>OVERSIZE GEARS</u>	<u>UNDERSIZE GEARS</u>
Identification Mark on Gear	Identification Mark on Gear
.001                      ①	.001                      ①
.002                      ②	.002                      ②
.003                      ③	.003                      ③
.004                      ④	.004                      ④
.005                      ⑤	.005                      ⑤
.006                      ⑥	.006                      ⑥

## PARTS LIST

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
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FIG. 1 - EXTERNAL VIEW ENGINE PARTS GROUP

100P235	1	Engine, Replacement (CONTINENTAL Type F-162 Spec 1377) - General description: INCLUDES Complete Block, also Valve Cover, Cylinder Head, Oil Pan, Thermostat, Water Pump, Fan Hub, Flywheel, Manifold; EXCLUDES Radiator, Air Cleaner, Fan Blades, Flywheel Housing Fuel Pump, Governor, Ignition Wiring, Distributor, Spark Plugs, Charge Generator, Charge Regulator, Carburetor, Fan Belt, Oil Filter, Oil Fill Neck. Note: See also Cylinder and Crankcase Assembly.
185-807	1	Shaft Assembly, Distributor Drive - (CO)F600M-2160.
(CO)PYM-201	1	Coupling, Drive Distributor Drive Shaft.
(CO)X-1735	1	Pin, Distributor Drive Coupling.
(CO)F162M-271	1	Adapter, Distributor.
(CO)X-1802-G	1	Nut - 3/8-16 - Distributor Adapter to Cylinder Head.
(CO)X-226	1	Washer, Lock - 3/8 in. - Distributor Adapter to Cylinder Head - Replaces (CO)X-203.
(CO)F226K-337	1	Elbow, Outlet - Cylinder Water.
870-48	2	Nut - 5/16-18 - Outlet Elbow (CO)X-1801-E.
850-45	2	Washer, Lock - 5/16 in. - Outlet Elbow - (CO)X-202.
(CO)X-101-B	1	Plug, Pipe - 1/2" - Cylinder Water Outlet Elbow.
(CO)X-110	1	Plug, Pipe - 3/8" - Cylinder Water Outlet Elbow.
185-747	1	Gasket, Cylinder Water Outlet Elbow - (CO)C400K-215.
185-506	1	Head Assembly, Cylinder (Includes Head, Header Studs and Plug) - Standard Compression - (CO)F140A-310.
110A813	1	Head Assembly, Cylinder (Includes Head, Header Studs and Plug) - High Compression - For use with Gaseous Fuel, 15 HC Units Only.
(CO)X-19837	2	Stud - 5/16-18 x 2-1/8" - Water Outlet Elbow.
(CO)X-101-B	1	Plug, Pipe - 1/2" - Countersunk.
(CO)X-19004-C	1	Stud - 3/8-16 x 1-1/2" - Distributor Adapter to Cylinder Head.
309-39	1	Thermostat, Coolant Water (CO)F226K-318.
185-750	1	Ring, Thermostat Adapter - (CO)F218K-202.
(CO)X-1015	1	Cock, Drain - Cylinder Water - Replaces (CO)X-1005.
185-513	1	Gasket, Cylinder Head - (CO)F400A-336.
(CO)D600L-3000	1	Rod Assembly, Oil Gauge.
509-29	1	Felt, Oil Gauge Rod Cover (CO)K404L-210.
505-135	1	Nipple, Pipe - Cylinder Water Outlet Elbow Ell - 3/8" (CO)X-12517.

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 1 - EXTERNAL VIEW ENGINE PARTS GROUP (Cont.)			
22	(CO)Y400L-266	1	Support, Oil Gauge Rod.
23	(CO)F400A-42170-A	1	Cylinder and Crankcase Assembly - Includes cylinder and crankcase, bearings, bushings, guides, inserts, support, guard, screws, studs, plugs and pins.
23	(CO)F400A-42170-C	1	Cylinder and Crankcase Assembly - Includes all parts in the "A" assembly plus pistons and and rings.
23	(CO)F400A-42170-I	1	Cylinder and Crankcase Assembly - Includes all parts in the "C" assembly with valves, springs, locks, retainers, and tappet assembly.
23	(CO)F400A-42170-S	1	Cylinder and Crankcase Assembly - Includes all parts in the "I" assembly plus connecting rods, crankshaft, camshaft, front end plate, gears, filler blocks, cylinder head, gaskets, gear cover assembly, oil pump assembly, oil pan assembly, studs, nuts, screws, washers, plugs and lock wires.
24	(CO)8TC-200	1	Dowel, Ring - Gear Cover to Crankcase.
25	185-581	1	Gasket, End Plate to Cylinder - (CO)F400B-225.
26	(CO)F400B-322	1	Plate, End - Crankcase.
27	(CO)X-3941	1	Screw, Front End Plate to Gear Cover - 3/8-16 x 7/8".
27	(CO)X-3896	1	Screw and Washer Assembly, Front End Plate to Cylinder - 5/16-18 x 3/4".
27	(CO)X-226	1	Lockwasher, Front End Plate to Gear Cover - 3/8" - Replaces (CO)X-203.
28	(CO)F400B-383	1	Gasket, Gear Cover to End Plate - Replaces (CO)F400B-320.
29	(CO)X-1803-H	1	Nut, 7/16-14 - Gear Cover to End Plate.
30	(CO)X-14220	1	Washer, Lock - 7/16" - Gear Cover - Replaces (CO)X-270.
31	(CO)X-5823	1	Screw, Dowel - Gear Cover to End Plate - Replaces (CO)D600B-221.
32	(CO)F400B-4142	1	Cover Assembly, Gear (Including Cover and Seal).
33	185-842	1	Seal, Fan Drive Pulley and Front Crankshaft Bearing Oil (Listed in External View, Engine) - (CO)X-1555.
34	185-849	1	Stud - 3/8-16 x 1-11/16" - Gear Cover to Cylinder (Upper Holes) - (CO)X-4200.
34A	(CO)X-4228	1	Stud - 3/8-16 x 1-7/8 - Gear Cover to Crankcase
35	(CO)X-226	2	Washer, Lock - 3/8" Gear Cover to Cylinder - Replaces (CO)X-203.
36	(CO)X-1802-G	2	Nut - 3/8-16 - Gear Cover to Cylinder.
37	(CO)X-226	1	Washer, Lock - 3/8" Gear Cover to Cylinder - Replaces (CO)X-203.
38	(CO)X-3295	1	Screw - 3/8-16 x 1-1/8" - Gear Cover to Cylinder.
39	(CO)X-14220	2	Washer, Lock - 3/8" - Gear Cover to Crankcase - Replaces (CO)X-270.
40	(CO)X-3368	1	Screw - 7/16-14 x 1-1/2" Gear Cover to Crankcase (at ring dowel).

REF. PART  
NO. NO.

QUANT.  
USED

DESCRIPTION

FIG. 1 - EXTERNAL VIEW ENGINE PARTS GROUP (Cont.)

41	(CO)X-14134	2	Washer, Copper - 3/8" Gear Cover to Filler Block (Upper).
42	(CO)X-3295	1	Screw - 3/8-16 x 1-1/8" - Gear Cover to Filler Block.
43	(CO)X-3299	3	Screw - 3/8-16 x 2" - Gear Cover to Filler Block.
44	(CO)X-226	2	Washer, Lock - 3/8" - Gear Cover to Filler Block - Replaces (CO)X-203.
45	(CO)X-3295	1	Screw - 3/8-16 x 1-1/8" - Gear Cover to End Plate.
45	(CO)X-3941	1	Screw - 3/8-16 x 7/8" - Front End Plate to Gear Cover.
46	(CO)X-226	1	Washer, Lock - 3/8" - Front End Plate to Gear Cover - Replaces (CO)X-203.
47	(CO)X-1802-G	1	Nut - 3/8-16 - Gear Cover to End Plate.
48	(CO)D600B-203	1	Dowel, Ring - End Plate to Crankcase.
49	(CO)F400B-442	2	Gasket, Oil Pan.
50	185-577	1	Block, Filler (Front) - (CO)D600B-340.
51	850-50	2	Washer, Lock - 3/8" - Filler Block to Crankcase Screw - (CO)X-297-A.
52	800-27	2	Screw, Front Filter Block to Crankcase - 5/16-18 x 7/8" (CO)X-3924.
53	185-584	1	Cork, Front - Filler Block to Crankcase - (CO)F400B-255.
54	(CO)F400B-4580	1	Oil Pan.
55	(CO)X-3896	14	Screw and Lock Washer Assembly - 5/16-18 x 3/4".
56	185-584	1	Cork - Rear Filler Block - (CO)F400B-255.
57	(CO)X-2958	2	Screw, Filler Block to Crankcase, Rear - 5/16-18 x 2-5/8".
58	850-50	2	Washer, Lock - Rear Filler Block to Crankcase - (CO)X-297-A.
59	185-578	1	Block, Filler (Rear) - (CO)D600B-406.
60	185-583	2	Seal, Oil - Rear Bearing Filler Block - Felt against neoprene - Installed with felt toward rear - (CO)F400B-252.
61	185-574	1	Guard, Oil - Crankshaft Bearing, Rear - (CO)D600B305.
61A	185-582	1	Felt, Rear Bearing Oil Guard - 1/2" Thick - to be secured with Shellac or equal-(CO)F400B-251.
62	(CO)15SL-211	1	Valve, Relief - Oil Pressure.
63	(CO)X-14324	As Req.	Washer, Adjusting - Oil Pressure Relief Valve - Replaces (CO)W5L-213.
64	(CO)F400L-223	1	Spring, Oil Pressure Relief Valve - Replaces (CO)F400L-219.
65	185-838	1	Gasket, Oil Pressure Relief Valve Plug - (CO)X-365.
66	(CO)41AL-200	1	Plug, Oil Pressure Relief Valve.
67	(CO)X-4036	2	Stud, 1/4-20 x 1-3/8" - Valve Chamber Cover.
68	185-837	2	Gasket, Valve Chamber Cover Nut - (CO)X-334.
69	(CO)X-18327	2	Nut - Valve Chamber Cover.

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 1 - EXTERNAL VIEW ENGINE PARTS GROUP (Cont.)			
70	185-504	1	Gasket, Valve Chamber Cover - (CO)F124A-201.
71	(CO)F400A-2410	1	Cover Assembly, Valve Chamber.
72	(CO)X-12150	1	Elbow, Vent Tube - Valve Chamber Cover.
73	(CO)P39A-221	1	Tube, Vent - Valve Chamber Cover.
74	185-849	6	Stud, Int. and Exh. Manifold to Cylinder - 3/8-16 x 1-11/16" - (CO)X-4200.
75	526-29	3	Washer, Plain - 3/8" - Manifold to Cylinder (CO)UB-110.
76	185-855	7	Nut - 3/8-16 Brass - Manifold to Cylinder - (CO)X-18278.
77	(CO)X-4256	1	Stud - Int. and Exh. - Manifold to Cylinder - 3/8-16 x 3-5/8".
78	(CO)X-14141	4	Washer, 13/32" - Manifold to Cylinder.
79	505-57	1	Plug, Pipe - 1/8 - Sq. Head - Exhaust Manifold - (CO)X-100.
80	185-638	1	Gasket, Exhaust and Intake Manifold to Cylinder - (CO)F400E-303.
81	185-635	1	Manifold Assembly, Intake and Exhaust - (CO)F162E-502.
82	870-48	2	Nut, 5/16-18 - Fuel Pump Mounting (CO)X-1801-E.
83	850-45	2	Washer, Lock - 5/16 - Fuel Pump Mounting-(CO)X-202.
84	(CO)X-1954-B	2	Stud, 5/16-18 x 1-1/2 - Fuel Pump Mounting - Replaces (CO)X-1952.
85	149A126	1	Gasket, Fuel Pump Mounting - (CO)16EV-201.
86	(CO)X-4723	14	Stud - 7/16-14-20 x 3-1/2" - Cylinder Head to Cylinder - Replaces (CO)X-19828.
	(CO)X-4731	1	Stud - 7/16-14-20 x 4 lg. - Distributor Adapter - Replaces (CO)X-4349.
89	(CO)3X-X-1408	15	Washer, Plain.
90	(CO)3X-X-1803-E	15	Nut - 7/16-20 - Cylinder Head.
91	309B10	1	Switch, Low Oil Pressure.
	(CO)X-2963	2	Screw, Dowel - 7/16-14 x 1-1/2" - Flywheel Housing to Crankcase - Replaces (CO)X-2693- (was in error).
	517-28	1	Plug, Hubbard - Camshaft Bushing (Rear), 1-1/2" - (CO)X-2236.
	517-41	1	Plug, Hubbard - Cylinder Core Hole - 1-1/8" (CO)X-2207.
	(CO)X-2202	2	Plug, Hubbard - Cylinder Core Hole - 1-3/8".
	(CO)X-5798	2	Screw and Washer, Filler Block to Flywheel Housing - Replaces (CO)X-3056.
	850-40	2	Washer, Lock - Filler Block to Flywheel Housing (CO)X-201.
	(CO)F162U-109	1	Gasket Kit, Valve Grinding.

REF. NO. PART NO. QUANT. USED

DESCRIPTION

FIG. 2 - INTERNAL VIEW ENGINE PARTS GROUP

1	(CO)F400C-500	1	Crankshaft -Replaces (CO)F400C-5000.
2	(CO)D600C-204	2	Washer, Thrust - Crankshaft.
3	185-698	1	Pin - 5/32 x 1/2 in. - Crankshaft Thrust Washer to Crankcase - (CO)6TG-101.
4	185-623	8	Shim, Thrust - Crankshaft (.002 in.) - Use as required - (CO)10EC-204.
5	185-624	8	Shim, Thrust - Crankshaft (.008 in.) - Use as required - (CO)10EC-205.
6	(CO)F600C-205	1	Plate, Thrust - Crankshaft.
7	(CO)D600H-300	1	*Gear, Timing - Crankshaft.
8	(CO)X-534	2	Key, Crankshaft Gear, and Fan Drive Pulley - Replaces (CO)X-511.
9	(CO)A600C-204	1	Thrower, Oil - Crankshaft
10	185-842	1	Seal, Front Crankshaft Bearing Oil and Fan Drive Pulley - (CO)X-1555.
11	(CO)F140K302	1	Pulley, Fan Drive (On Crankshaft).
12	185-748	1	Plug, Keyway - Fan Drive Pulley - (CO)C400K217.
13	(CO)8UO-202	1	Washer, Crankshaft Starting Jaw to Crankshaft - Replaces (CO)F600-0-205.
14	(CO)F600-O-206	1	Jaw, Starting.
15	(CO)F400B-348	1	Cap, Bearing - Front.
16	185-831	1	*Kit, Crankshaft Front Bearing (F600T-227) - Upper and Lower - Includes Washer and Bearing - (CO)F600G-3491.
17	(CO)F400B-350	1	Cap, Bearing - Center
18	185-654	1	*Bearing, Crankshaft - Center Upper and Lower - (CO)F400G-3111.
19	(CO)F400B-349	1	Cap, Bearing - Rear.
20	185-667	1	*Bearing, Crankshaft - Rear Upper and Lower - (CO)F600G-3471.
21	(CO)X-14455	6	Washer, Plain - 1/2" - Crankshaft Bearing Cap to Cylinder - Replaces (CO)3X-B2B-110.
22	(CO)X-2986	4	Screw, Crankshaft Bearing Cap - Front and Rear - 1/2-13 x 2-5/8".
23	(CO)6SH-100	2	Wire, Lock - No. 19 x 10 - Front and Rear Bearing - Replaces (CO)X-1333-B.
24	(CO)X-3511	2	Screw, Crankshaft Bearing Cap - Center - 1/2-13 x 3-1/4".
25	(CO)6SH-100	1	Wire, Lock - No. 19 x 12 for Center Bearing - Replaces (CO)X-1333-B.
26	185-628	2	Rod and Cap Assembly (Including Bearings, Bushing, Bolts and Nuts, Cylinders 1-3) - (CO)F400D-5021.
26	185-627	2	Rod and Cap Assembly (Including Bearings, Bushing, Bolts and Nuts, Cylinders 2-4) - (CO)F400D-3031.
27	185-659	4	Bearing Half (1-8 Connecting Rods) - (CO)F600G-341.

\* - Refer to, Available Oversize and Undersize Parts Chart.

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 2 - INTERNAL VIEW ENGINE PARTS GROUP (Cont.)			
27	185-660	4	*Bearing Half (2-4 Connecting Rods) - (CO)F600G-342.
28	(CO)F400G-211	4	Bushing, Piston Pin
29	(CO)C600D-206	8	Bolts, Connecting Rod.
30	(CO)X-18188	8	Nut, Connecting Rod Bolt - 3/8-24.
31	(CO)X-601	8	Pin, Cotter - Connecting Rod Bolt - 3/32 x 3/4".
32	185-511	4	Piston and Pin Assembly - (CO)F162A-4101-E.
33	(CO)X-7011	8	Ring, Piston Pin Retaining.
34	185-573	4	*Pin, Piston - (CO)11EA-200.
35	(CO)F162A-410	4	Piston Only - Less Pin - Order Piston Pin Assembly.
36	(CO)F162A-302	4	*Ring, Piston - Bottom Groove.
37	185-500	12	Ring, Piston - First, Second and Third Grooves - (CO)A600A-333.
38	185-605	6	Bolt, Flywheel to Crankshaft - (CO)C400C-206.
39	854-20	6	Washer, Lock - 3/8" - Flywheel - (CO)X-297.
40	104A91	6	Nut - 3/8-24 - Flywheel Mounting (CO)X-18237.
41	(CO)F162C-321	1	Flywheel - Replaces (CO)F162C350.
	113-73	4	*Ring Set, Piston - Complete for 1 Piston.
	185-820	1	*Kit, Piston Ring - Complete for 4 Pistons - For Re-Ring - Expander Type - Standard Size - (CO)162T-152C.
	(CO)162T-153C	1	*Kit, Piston Ring - Complete for 4 Pistons - For Re-Bore - Standard Size.
	185-824	1	*Bearing Kit, Main - (Complete for Engine) - (CO)F400T-151.
	185-825	1	*Bearing Kit, Rod - (Complete for Engine) - (CO)F400T-152.

\* - Refer to, Available Oversize and Undersize Parts Chart.

FIG. 3 - CAMSHAFT &amp; OIL PUMP PARTS GROUP

1	185-714	1	Camshaft - (CO)F400I-403.
2	(CO)X-2977	2	Screw and Washer Assembly - 3/8-16 x 7/8" - Camshaft Thrust Plate.
4	185-706	1	Plate, Thrust - Camshaft - (CO)D600I-259.
6	(CO)F600L-203	1	Plate, Oiler - Timing Gear

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 3 - CAMSHAFT AND OIL PUMP PARTS GROUP (Cont.)			
7	(CO)X-14220	1	Washer, Lock - 3/8" - Camshaft Thrust Plate - Replaces (CO)X-270.
8	(CO)X-3362	1	Screw - 7/16-14 x 1-1/4 - Camshaft Thrust Plate to Crankcase.
9	185-700	1	Gear, Timing - Camshaft - (CO)F400H-310.
10	515-94	1	Key - Woodruff No. 6 - (CO)X-506.
11	185-705	1	Lock, Nut to Timing Gear - (CO)D600I-258.
12	(CO)X-18242	1	Nut, 3/4-16 - Camshaft Timing Gear.
13	(CO)F226G227	1	Bushing, Camshaft - Front - Replaces F600G-295.
14	(CO)Y400G-231	1	Bushing, Camshaft - Center - Replaces (CO)Y400G-228.
15	(CO)Y400G-232	1	Bushing, Camshaft - Rear - Replaces (CO)Y400G-229.
16	(CO)F600I-2520	8	Tappet, Valve - Self Locking - Replaces (CO)Y400I-211, (CO)Y400I-212, & (CO)Y400I-213.
16A	(CO)Y400I-211	8	Tappet only, Valve - Order F600I-2520.
17	(CO)Y400I-212	8	Nut, Lock - Valve Tappet - Use with Y400I-211 Only.
18	(CO)Y400I-213	8	Screw, Adjusting - Valve Tappet - Use with Y400I-211 Only.
19	185-745	8	Cap, Roto - Positive Valve Rotation Type - (CO)Z120I-3000.
20	185-735	8	Spring, Valve - Intake and Exhaust - (CO)Y400I-215.
21	(CO)F400I-233	8	Guide, Valve Stem.
22	(CO)F226A-238	4	Insert, Valve Seat - Exhaust - .010" Oversize.
23	185-744	16	Lock, Retainer - Valve Spring (Roto) - (CO)Z120I-235.
24	185-713	4	Valve, Exhaust - (CO)F400I-328.
24	185-719	4	Valve, Intake - (CO)F600I-343.
25	(CO)F400L-210	1	Bushing, Oil Pump Drive Shaft (In Crankcase).
	185-790	1	Pump Assembly, Oil - (CO)F600L-4131.
26	(CO)F600H-205	1	Gear, Oil Pump Drive.
27	(CO)X-17095	1	Pin, 3/16 x 15/16" - Oil Pump Drive Gear to Shaft.
28	(CO)F600L-4130	1	Body Assembly, Oil Pump - Includes Body and Bushing.
29	(CO)D600G-274	1	Bushing, Oil Pump Drive Shaft - (In Pump Body).
30	(CO)F218L-204	1	Shaft, Drive - Oil Pump.
31	515-1	1	Key, Woodruff No. 3 - Oil Pump Drive Gear to Shaft (CO)X-584.
32	(CO)F600H-217	1	Gear, Driver - Oil Pump.
33	(CO)F600H-218	1	Gear, Idler - Oil Pump.
34	(CO)8UL-212	1	Stud, Oil Pump Idler Gear.
35	(CO)D600L-204	1	Ring, Snap - Oil Pump Drive Shaft.
36	185-789	1	Gasket, Oil Pump Cover - (CO)C400L-231.



REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 3 - CAMSHAFT & OIL PUMP PARTS GROUP (Cont.)			
37	(CO)F400L-2511	1	Cover Assembly, Oil Pump.
38	185-801	1	Gasket, Oil Pump Strainer Frame - (CO)17EL-204.
39	(CO)17EL-300	1	Frame, Oil Pump Strainer Screen.
40	(CO)C400L-228	1	Spacer, Oil Pump Suction Cup.
41	850-40	6	Washer, Oil Pump Cover to Body (CO)X-201.
42	(CO)X5798	6	Screw and Lockwasher, Oil Pump to Body - Replaces (CO)X-3056.
43	(CO)D600L-2120	1	Screen Assembly, Oil Pump Strainer.
44	185-859	1	Stud, Oil Pump to Bearing Cap - 3/8-16 x 1-1/2" - (CO)X-20040.
45	(CO)X-226	1	Washer, Oil Pump to Bearing Cap - Replaces (CO)X-203.
46	(CO)X-1802-G	1	Nut, Oil Pump to Bearing Cap - 3/8-16".
	(CO)X-14294	1	Washer, 3/8 x 1/8 - Between Bearing Cap and Oil Pump Mounting Lug.
	(CO)F400T-181	1	Kit, Camshaft Bushing (Finish Reamed) - Complete for Engine.
	(CO)F400T-314	1	Kit, Valve Tappet - (Complete for Engine - 8 pcs.)
	(CO)F600T-293	1	Kit, Oil Pump Repair

FIG. 4 - WATER PUMP PARTS GROUP

FIG. 4 - WATER PUMP PARTS GROUP			
	(CO)F400K-3947	1	Pump, Water - Replaces (CO)F400K-3941.
	(CO)F400T-253	1	Kit, Water Pump Repair Parts (For servicing F400K-3941 Pump and F400K-3947).
1	(CO)X-3794	4	Screw, Cover to Body.
2	(CO)F400K-392	1	Cover, Water Pump.
3	(CO)F400K-391	1	Gasket, Water Pump Cover.
4	(CO)F162K-2560	1	Impeller, Water Pump.
5	(CO)N62K-211	1	Seal, Water Pump.
6	(CO)F400K-291	1	Shedder, Water.
7	(CO)X-7022	1	Ring, Seat Bearing.
8	185-751	1	Shaft and Bearing - (CO)F226K-2230.
9	185-845	1	Hose, Water Pump to Water Outlet Elbow - (CO)X-2441
10	503-49	2	Clamp, Hose - Water Pump (CO)X-2376.
11	505-135	2	Nipple, 3/8" Pipe - Water Pump Outlet (CO)X-12517
12	(CO)F400K-418	1	Body, Water Pump
13	(CO)X-7021	1	Retainer, Water Pump Bearing.

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 4 - WATER PUMP PARTS GROUP (Cont.)			
17	185-754	1	Hub, Fan - (CO)F400K-385.
19	(CO)X-226	3	Washer, Lock - 3/8" - Water Pump - Replaces (CO)X203.
20	800-55	2	Screw, 3/8-16 x 2-1/4" - Water Pump to Cylinder - (CO)X-3939.
20	(CO)X-3319	1	Screw, Water Pump to Cylinder - 3/8-16 x 2-1/8".
21	800-51	1	Screw, 3/8-16 x 1-1/4" - Water Pump to Cylinder - (CO)X-3063.
22	(CO)X-14134	1	Washer, Copper - 3/8" - Water Pump to Cylinder.
23	185-752	1	Gasket, Water Pump to Cylinder Block - (CO)F400K-340.
	(CO)K600K-220	1	Gasket, Water Pump Seal (Not Illustrated).

FIG 5 - OIL SYSTEM GROUP

1	122-91	1	Filter, Oil - Complete with Cartridge and Mounting Bracket.
2	122-37	1	Cartridge, Oil Filter Refill - Includes Gaskets.
3	502-2	2	Elbow, Inverted Male - Oil Filter - (WH)400x4.
4	122A86	1	Line, Oil Filter Return.
5	122A87	1	Line, Oil Filter Inlet.
6	520A221	2	Stud, Oil Filter Mounting - 5/16-18 x 1".
7	505-50	1	Elbow, Pipe Street - 1/2" - Oil Drain.
8	505-100	2	Nipple, Pipe Close - 1/2" - Oil Drain.
9	504-11	1	Valve, Oil Drain - 1/2".
10	503-197	1	Clamp, Hose - Oil Drain.
11	503-316	1	Hose, Oil Drain - 3/4" I.D. x 1" O.D. x 11" Long.
12	123B96	1	Tube, Oil Fill.
13	123A20	1	Cap, Oil Fill Tube.

Note: Refer to Control Group for Oil Pressure Gauge.

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 6 - MUFFLER GROUP			
1	155B456	1	Muffler, Exhaust.
2	155A565	1	Mounting Flange, Muffler.
3	154-351	1	Gasket, Muffler Mounting Flange.
4	155B493	1	Tubing, Exhaust.
5	505-32	1	Coupling.
FIG. 7 - GOVERNOR & GOVERNOR LINKAGE GROUP			
1	151P175	1	*Governor Assembly - Includes Gear - Hoff No. GD270-C5137 - Used PRIOR to Serial #593603.
1	151P182	1	*Governor Assembly - Includes Gear - Hoff No. GD270-C7147 - Used BEGIN Serial #593603.
2	151A139	1	Gasket, Governor Mounting.
3	185-819	1	Gasket, Governor Flange Plate - (CO)Y91S-215.
4	(CO)F400S-201	1	Plate, Governor Flange - (Kidney Shaped).
5	(CO)X-318	1	Gasket, Governor to Gearcover - Upper - 3/8 Copper Asbestos.
6	(CO)X-3283	1	Screw, Governor to Gear Cover - 3/8-16 x 3-5/8" Long.
7	520A479	1	Stud, Governor Link.
8	150A638	2	Joint, Ball - Governor Link - 1/4-28 Thread.
7, 8	150A695	1	Linkage Assembly, Governor.
* - For Complete Assembly, Use Governor #151P182. For Components, See separate group.			
FIG. 8 - GOVERNOR PARTS GROUP			
1	151P175	1	Governor - Complete with Gear (HOF)GD270-C5137 - Used PRIOR to Serial #593603 (For Complete Assembly, Use Governor #151P182).
1	151P182	1	Governor - Complete with Gear (HOF)GD270-C7147 - Used BEGIN Serial #593603.
1	(HOF)D104-145	1	†Lever, Throttle.
1	(HOF)D132-81	1	Sensitivity Assembly - Includes Lever and following indented parts not individually illustrated.
1	(HOF)D132-83	1	Pin, Sensitivity Adjusting - Prior to Serial #593603.
1	(HOF)D165-33	1	Pin, Sensitivity Adjusting - Begin Serial #593603.
1	(HOF)D117-86	1	Retainer, Spring Bushing to Pin - Replaces (HOF)D165-18.
1	(HOF)D117-46	1	Washer, Sensitivity Pin to Spring Bushing - Prior to Serial #593603.
1	(HOF)D129-23	1	Washer, Sensitivity Spring.
		1	Bushing, Spring Link - Prior to Serial #593603.

## PARTS LIST

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 8 - GOVERNOR PARTS GROUP (Cont.)			
	(HOF)D165-31	1	†Retainer, Bearing to Shaft.
	(HOF)D117-85	1	Spacer, Spring Link - Begin Serial #593603.
	(HOF)D105-127	1	Link, Spring - Begin Serial #593603.
	(HOF)D133-17	1	Bearing, Spring Link - Prior to Serial #593603.
	(HOF)D117-87	1	Washer, Lock - Adjusting Pin.
	(HOF)D115-29	1	Nut, Adjusting Pin.
	(HOF)D132-76	1	†Pin, Throttle Lever to Rocker Shaft.
3	(HOF)D117-72	1	†Washer, Lever Spacer.
4	(HOF)D114-133	1	Screw, Speed Adjusting.
5	(HOF)D115-29	1	Nut, Lock - Speed Adjusting.
6	(HOF)D105-223	1	Lever, Speed Adjusting - Prior to Serial #593603.
6	(HOF)D105-292	1	Lever, Speed Adjusting - Begin Serial #593603.
7	(HOF)D129-18	1	Bushing, Adjusting Lever Pivot.
8	(HOF)D117-87	1	Washer, Lock - Adjusting Lever to Body.
9	(HOF)D114-179	1	Screw, Adjusting Lever to Body.
10	(HOF)D110-85	1	Spring, Speed (120 #Rate - Black) Prior to Serial #593603.
10	(HOF)D110-57	1	Spring, Speed (120 #Rate - Black) Begin Serial #593603.
11	(HOF)D164-120	1	Screw, Bumper - Complete with Spring, Nut and Seal.
12	(HOF)D127-133	1	†Shaft, Rocker.
13	(HOF)D133-24	2	†Bearing, Rocker Shaft.
14	(HOF)D108-23	1	†Seal, Rocker Shaft Oil - Replaces (HOF)D108-8.
15	(HOF)D105-67	1	Lever, Rocker Shaft.
16	(HOF)D114-163	2	Screw, Lever to Rocker Shaft.
17	(HOF)D150-101	1	†Spacer, Welch Plug.
18	(HOF)D140-24	1	†Plug, Welch.
19	(HOF)D133-14	1	†Bearing, Rear Main - Bushing Type.
20		1	†Body Only - Not Sold Separately.
21	(HOF)D164-293	1	Gear Assembly - Includes Gear, Shaft, Cover, Ball Bearing, Rivet and Yoke.
22	(HOF)D164-393	1	Thrust Sleeve and Bearing Assembly - Includes Sleeve, Bearing, Washer and Retainer.
23	(HOF)D164-118	2	Flyweight Assembly - Includes Thrust Pin and Bearing - Prior to Serial #593603.
23	(HOF)D164-547	2	Flyweight Assembly - Includes Thrust Pin and Bearings - Begin Serial #593603.
24	(HOF)D132-88	2	Pin, Flyweight Pivot.
25	(HOF)D165-32	4	Retainer, Flyweight Pivot - Replaces (HOF)D165-17.
26	(HOF)D114-128	1	Screw, Cover to Body.
27	(HOF)D164-451	1	Body Assembly - Includes parts marked (†).

† - Included in Body Assembly (HOF)D164-451.

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 9 - VACUUM BOOSTER GROUP			
1	150K689	1	Booster Kit, Vacuum Assembly - Replaces 150B680.
2	150K582	1	Diaphragm Assembly (Replaces #150A477).
3	150A666	1	Plate, Diaphragm.
4	150A679	1	Spring, Internal - Booster.
5	516-85	1	Pin, Roll.
6	150A668	1	Gasket.
7	150A376	1	Bracket, Booster Spring.
8	150C683	1	Bracket, Vacuum Booster.
9	150A686	1	Bracket, Booster External Spring.
10	150A471	1	Spring, External - Booster.
11	150A681	1	Line, Vacuum Booster - Copper.
12	150A685	1	Fitting and Tube Assembly.
13	502-37	1	Elbow, Invert - Male.
14	509P75	1	"O" Ring.
15	502A215	1	Connector.

FIG. 10 - FUEL SYSTEM GROUP (GASOLINE)

1	143K60	1	Kit, Gasket - Carburetor.
2	153A26	1	Gasket, Insulating - Choke Control to Manifold.
3	153P87	1	Choke, Automatic - Sisson 12-volt (Not used with special water cooled manifold).
4	503-107	3	Clamp, Hose - Mounting Air Cleaner Hose - 1-5/8" I.D (Replaces #503A22).
5	153A199	1	Rod, Choke Control - 1/4" x 12-1/4" long.
6	518-6	1	Clip, Choke Control Rod End.
7	140A218	1	Bracket, Air Cleaner Hose Mounting.
8	140B303	1	Cleaner, Air.
	140A78	2	Band, Air Cleaner.

## PARTS LIST

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 10 - FUEL SYSTEM GROUP (GASOLINE) Cont.			
9	140B311	1	Bracket, Air Cleaner - Unhoused Plant only.
9A	140C287	1	Bracket, Air Cleaner - Housed Plant only.
10	503A205	1	Hose, Air Cleaner - Wiremold - 1-1/2" I.D. x 32" long.
11	503A207	1	Hose, Breather - Valve Compartment Cover to Air Cleaner - 5/8" I.D. x 21" long.
	503-262	1	Hose, Breather - Valve Compartment Cover to Air Cleaner - 5/8" I.D. x 18" long.
12	503P131	2	Clamp, Hose - Breather Hose.
13	149A394	1	Line, Fuel - Fuel Pump to Carburetor.
14	143C21	1	Carburetor, Gasoline - CARTER #UT-2054S - For plants with Sisson Choke.
15	141-281	1	Gasket, Carburetor Mounting - Interchangeable with (CAR) #1A-48 or (CO) NF-104 For Models without Dripshield - Carburetor to Manifold
		2	For Models with Dripshield - (1) Carburetor to Dripshield, (1) Dripshield to Manifold
16	508-2	1	Grommet, Rubber - 3/8" I.D.
17	505-19	1	Bushing, Pipe Reducer - 1/2 x 3/8 - Breather.
18	505A135	1	Nipple, Pipe Half - 3/8 x 1-1/2 - Breather.
19	149P61	1	Pump, Fuel.
20	149A126	1	Gasket, Fuel Pump Mounting.
21	502-2	2	Elbow, Inverted Male - (1) Carburetor, (1) Fuel Pump - 400 x 4.
	502-65	1	Elbow, Inverted 45°.
22	520A567	1	Stud, Carburetor Mounting - 5/16 x 1-1/2".
22	520A223	1	Stud, Carburetor Mounting - 5/16 x 1-1/4".
	149K508	1	Kit, Fuel Pump Repair Parts.
	143A58	1	† Carburetor, Gasoline - Basic 143C21 with provision for ONAN choke.
23	153A155	1	† Adapter, Onan Choke - Mounts to Carburetor.
24	153A58	1	† Housing, Thermostatic Bimetal - Onan Choke.
25	153-57	1	† Bimetal, Thermostatic - Onan Choke - (flat coiled spring).
26	153A49	1	† Cover, Onan Choke - 12-17 volt heating element - For 12 volt cranked plants.
27	143A57	1	† Shaft, Carburetor Choke - Includes knurled knob - For plants with Onan choke.
	145B298	1	Shield, Carburetor Drip.
	336A505	1	Lead, Choke Ground.

† - These parts apply for plants with special water cooled manifold. Onan electric choke is used instead of Sisson automatic choke.

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 11 - CARBURETOR PARTS GROUP (GASOLINE)			
1	143C21	1	Carburetor - CARTER Updraft.
2	143K65	1	Kit, Carburetor Repair Parts - Includes parts marked (†).
	143K60	1	†Kit, Carburetor Gasket - Includes parts marked (★).
	143-23	1	Body Assembly, Throttle (Not Sold Separately).
	141-281	1	★Gasket, Carburetor Mounting - Interchangeable with (CAR) #1A-48 or (CO) NF-104 - (1 Only Included in 143K60 Kit)
		1	For Models without Dripshield - Carburetor to Manifold
		2	For Models with Dripshield - (1) Carburetor to Dripshield, (1) Dripshield to Manifold
3	143-25	1	Valve, Throttle.
4	143-26	1	†Shaft and Lever, Throttle.
5	143-27	1	Valve, Choke.
6	143-28	1	†Jet, Low Speed.
7	143-29	2	Plug, Rivet.
8	143-30	1	Plug, Rivet.
9	143-31	1	Plug, Idle Port Rivet.
10	143-32	1	Plug, Bowl Drain.
11	143-33	1	†Nozzle.
12	143-34	1	Shaft and Lever, Choke.
13	143A15	2	★Gasket, Nozzle.
14	143-36	1	★Gasket, Main Metering Screw.
15	143-37	1	Float and Lever.
16	143-38	1	†Pin, Float Lever.
17	143-39	1	†Needle and Seat.
18	143-40	1	Screw, Idle Adjustment.
19	812-14	4	†Screw, Throttle and Choke Valve Attaching.
20	(CAR)47-26	2	Plug, Welch.
21	143-42	1	Venturi.
22	143-43	1	Spring, Idle Adjustment Screw.
23	143-44	4	Screw and Washer, Body Attaching.
24	143-45	1	Screw, Throttle Adjusting.
25	143-46	1	★Gasket, Body.
26	143-47	1	Retainer, Air Horn Dust Seal.
27	143-48	2	Retainer, Choke and Throttle Shaft Dust Seal.

## PARTS LIST

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 11 - CARBURETOR PARTS GROUP (GASOLINE) Cont.			
28	143-49	1	†Screw and Needle, Adjustable Main Metering.
29	143-50	2	†Seal, Choke and Throttle Shaft Dust.
30	143-51	1	†Felt, Air Horn Drain.
31	143-52	1	†Packing, Main Metering Screw.
FIG. 12 - FUEL SYSTEM (GAS ONLY) - (Optional Equipment) GROUP			
1	148K349	1	Kit, Gas Conversion - Includes the Following Parts Marked #.
2	141A281	1	#Gasket, Carburetor Mounting.
3	148C311	1	#Regulator, Gas - Garretson - Atmospheric Type.
4	503-51	1	#Hose, Rubber - 5/8" I.D. x 36" Long.
5	503-49	1	#Clamp, Hose - For 1" O.D. Hose.
6	148A107	1	#Vent.
7	503-39	1	#Elbow - 3/8"-90°.
8	505-57	1	#Plug, Pipe - 1/8".
9	505-101	1	#Nipple - 3/8" x 1".
10	505A135	1	#Nipple, Pipe Half - 3/8" I.P.S. x 1-1/2" Long.
	148C350	1	#Carburetor Assembly - For operation on Gas Fuel only - Includes the following parts marked ##.
	148C348	1	Carburetor Assembly, Gas Fuel - Includes Parts Marked ## With The One Noted Exception.
	143-26	1	#Shaft and Lever, Throttle.
	520A567	1	##Stud, Carburetor Mounting - 5/16 x 1-1/2". (Not used on Carburetor No. 148C348)
	520A223	1	##Stud, Carburetor Mounting - 5/16 x 1-1/4". (Carburetor No. 148C348 Uses 2)
	142-344	1	##Needle, Idle Adjusting.
	142-76	1	##Spring, Idle Adjusting Needle.
	505-135	1	##Nipple, Pipe Half - 3/8" I.P.S. x 1-1/2" Long - Fuel Connection.
	148A207	1	##Venturi.
	148B520	1	##Adapter, Air Hose and Choke - Replaces 148B204.
	148A205	1	##Gasket, Body to Adapter.
	148A208	1	##Screw, Gas Adjusting (Power Jet).
# - Parts included in Conversion Kit. ## - Parts included in Gas Carburetor Assembly.			



REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 12 - FUEL SYSTEM (GAS ONLY) - (Optional Equipment) GROUP (Cont.)			
	868-4	1	## Nut, Hex Jam - 7/16-20 - Power Adjusting Screw.
	800-7	2	## Screw, Hex Head Steel Cap - 1/4-20 x 1" - Body to Adapter.
	850-40	2	## Washer, Lock - 1/4 - Body to Adapter.
	143-25	1	## Butterfly, Throttle Shaft.
	812-15	2	## Screw, Round Head Steel Machine - #3-48 x 1/4" - Fly to Shaft.
	854-3	2	## Washer, Shakeproof - I.T. #3 - Fly to Shaft.
	517A30	1	## Plug, Passage in Body.
	143-45	1	## Screw, Idle Stop.
	148C203	1	## Body, Carburetor.
	148C426	1	Carburetor Assembly, L.P.G. (not used with Garretson Regulator) - Includes Parts Marked ## and † with the Noted Exception.
	148A171	1	†Counterweight.
	148A209	1	†Shaft, Choke.
	148A210	1	†Butterfly, Choke.
	803-2	1	†Screw, Socket Head Set.
	## - Parts included in Gas Carburetor Assembly.		

FIG. 13 - FUEL SYSTEM (GAS-GASOLINE COMBINATION) - (Optional Equipment) GROUP

1	148K341	1	Kit, Gas-Gasoline Conversion - Includes the following parts marked ▲.
2	148C311	1	▲Regulator, Gas - Garretson Model K.N. - Atmospheric Type.
3	503-260	1	▲Hose, Rubber - 5/8" I.D. x 36".
5	503-49	2	▲Clamp, Hose - For 1" O.D. Hose.
6	505A135	1	▲Nipple, Pipe Half - 3/8" I.P.S. x 1-1/2" long.
	141-281	1	▲Gasket, Carburetor Mounting - Interchangeable with (CAR) #1A-48 or (CO) NF-104
		1	For Models without Dripshield - Carburetor to Manifold
		2	For Models with Dripshield - (1) Carburetor to Dripshield, (1) Dripshield to Manifold
7	148A107	1	▲Vent.
	▲ - Parts included in conversion package.		
	▲▲ - Parts included in Gas-Gasoline (combination) Carburetor only.		

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 13 - FUEL SYSTEM (GAS-GASOLINE COMBINATION) - (Optional Equipment) GROUP (Cont.)			
9	505-39	1	▲Elbow - 3/8" - 90°.
10	505-57	1	▲Plug, Pipe 1/8".
11	505-101	1	▲Nipple 3/8 x 1".
	148P390	1	Repair Kit, Gas Regulator.
11a	143B151	1	▲Carburetor Assembly - For Operation on either Gas or Gasoline Fuel - Parts below marked ▲▲ are peculiar to Carburetor #143B151, while other parts must be selected from the Gasoline Carburetor (#143C21) Parts Group.
	148A222	1	▲▲Float, Fuel Level.
	148A17	1	▲▲Gasket, Bushing - Float Locking Mechanism.
	148A223	1	▲▲Lock, Float.
	148A224	1	▲▲Valve - Gas Fuel Inlet.
	815-118	1	▲▲Screw, Fillister Head - #6-32 x 1/4" - For Locking Automatic Choke.
	143-54	1	▲▲Venturi.
	502-2	1	▲▲Elbow, Inverted Male.
	520A567	1	▲▲Stud, 5/16 x 1-1/2" - Carburetor Mounting.
	141A281	2	▲Gasket, (1) Carburetor Mounting, (1) Drip Shield Mounting.
	520A223	1	▲▲Stud, 5/16 x 1-1/4" - Carburetor Mounting.
11b	143B149	1	*Carburetor Assembly with Onan Electric Choke (Choke Parts Marked *).
12	141A502	1	*Adapter.
13	153A58	1	*Housing, Thermostatic Element.
14	157-57	1	*Housing, Thermostatic.
15	153A57	1	*Cover.
16	143A57	1	*Shaft, Choke.
17	141A501	1	*Spring, Choke Lock.
18	145B299	1	▲Shield, Carburetor Drip.

▲ - Parts included in conversion package.

▲▲ - Parts included in Gas-Gasoline (combination) Carburetor only.

\* - These parts used on plants with special water cooled manifolds.

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
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FIG. 14 - MOUNTED FUEL TANK GROUP (Optional Equipment) HOUSED PLANTS ONLY

1	159B642	1	Cap, Fuel Tank.
2	159D640	1	Band, Fuel Tank Hold-down.
3	159D639	1	Tank, Fuel.
4	502-2	2	Elbow, Inverted Male.
5	504P4	1	Valve, Fuel Shut Off.
6	501A15	1	Line, Fuel - Replaces 501-7.
7	505-57	1	Plug, Pipe - 1/8".
8	502-3	1	Connector, Inverted Male - Flex Line to Valve - For X-ray Models only.
9	502-53	1	Elbow, 45° Street - Solenoid Valve Inlet - For X-ray Models only.
10	502-82	1	Nipple, Hex - Brass pipe - Solenoid Mounting - For X-ray Models only.
11	307P565	1	Valve, Solenoid Fuel - For X-ray Models only.
12	416A95	1	Clip, Fuel Line - For X-ray Models only.
13	159P751	1	Gasket, Gas Tank Filler Neck.

FIG. 15 - SEPARATE FUEL TANK &amp; DAY TANK (Optional Equipment) GROUP

1	159A664	1	Tank Assembly, Reservoir - Includes parts marked (*) - (Prior to Serial No. 642844).
2	415A126	1	Tank, Fuel - 5 Gallon (Replaces all previous separate tanks).
3	504A13	1	Valve, Shut Off - Optional (For tanks with fuel outlet at bottom of tank).
4	501A27	1	Line, Fuel Tank to Pump.
5	415B124	1	Cap, Rain - Rubber (With provision for fuel line outlet).
6	159B294	1	*Tank, Reservoir ("Day" or "Standby").
7	159A641	1	*Band, Reservoir Tank.
8	159A657	1	*Bracket - Day Tank, Mounting.
9	502-24	2	*Elbow, Male Compression.
			*Bushing, Pipe.
	505-17	1	Prior to Serial No. 642844.
	159A705	1	Reducer, Restricted - Begin Serial No. 642844 (Used with pressurized day tank).
10	504A39	1	*Cock, Shut-Off - With Strainer - Prior to Serial No. 642844.

\* .. Parts included in tank assembly.

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 15 - SEPARATE FUEL TANK & DAY TANK (Optional Equipment) GROUP (Cont.)			
11	505-57	2	*Plug, Pipe Square Head.
	159C656	1	*Line, Fuel - Pump to Reservoir Tank.
	159C655	1	*Line, Fuel - Reservoir Tank to Carburetor.
	159-41	1	Cap, Vent - Reservoir Tank - Prior to Serial No. 642844.
	415A55	1	Bracket, Vent Cap - Prior to Serial No. 642844.
12	502-82	1	Nipple - Begin Serial No. 642844.
13	307P564	1	Valve, 12 V. Solenoid - Begin Serial No. 642844.
14	502-2	1	Elbow, Inverted Male - Begin Serial No. 642844.
15	501A5	1	Line, Fuel Flex - Begin Serial No. 642844.

\* - Parts included in tank assembly.

FIG. 16 - WATER & OIL SENDER GROUP

1	193B98	1	Sender, Oil Pressure.
	193A108	1	Spec A Only.
			Begin Spec B.
2			Sender, Water Temperature.
	193A100	1	Spec A Only.
	193A109	1	Begin Spec B.
3	309A146	1	Switch, Hi-Temperature - Non-Adjustable (Replaces 309A1).
4	502-1	1	Tee, Inverted - W550X4 - Oil Pressure Sender.
5	505-7	1	Bushing, Reducer - 1/4 x 1/8" Oil Pressure Sender.
6	502-20	1	Elbow - Street 3400x2.
7	505-117	1	Bushing, Face - 1/2 x 3/8".

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 17 - BATTERY IGNITION GROUP			
1	166B4	1	Distributor.
2	160A186	1	Clamp, Distributor Adjusting.
3	166B278	1	Coil, Ignition - 12 Volt (Replaces #166-259).
4	167-129	4	Spark Plug - Champion.
5	314-32	4	Suppressor, Spark Plug.
6	167A1070	4	Cable, Hi Tension - Does not include Suppressor.
7	314-6	1	Suppressor, Coil to Distributor.
8	167A1312	1	Cable, Hi Tension - Distributor to Suppressor 3" Length.
	167A1316	1	Cable, Hi Tension - Coil to Suppressor.
9	312A58	1	Condenser - Coil - Replaces 312A15.
10	166P235	1	Cap, Distributor.
11	166P234	1	Rotor, Distributor.
12	166P245	1	Contact Point Set - Distributor.
13	166B279	1	Clamp - Coil (Replaces 166-101).
15	336A336	1	Lead, Rotor Arm to Coil.
16	336A337	1	Lead - Hi Temperature Cut-off to Coil.
17	<del>307B40</del> 307-1046	1	Solenoid, Start.
18	336A332	1	Lead, Distributor to Coil.
19	312A10	1	Condenser, Distributor.

FIG. 18 - COOLING SYSTEM &amp; MOUNTING CUSHION GROUP

1	130-285	1	Radiator.
2	130C553	1	Cap, Radiator - Replaces 130P364.
2A	130-245	1	Gasket, Radiator Cap.
3	503B203	1	Hose, Radiator - Upper - 1-1/2 I.D. Inlet.
4	503B204	1	Hose, Radiator - Lower - 1-1/2 I.D. Outlet.
5	511-20	1	Belt, Fan - 46-1/2".



## PARTS LIST

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
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FIG. 18 - COOLING SYSTEM &amp; MOUNTING CUSHION GROUP (Cont.)

6	503-129	4	Clamp, Radiator Hose.
7	130B343	1	Fan Only, Cooling - 4 Blades, Pusher Type.
8	504-3	1	Valve, Drain - Radiator - (WH)145.
10	505-18	1	Bushing, Reducer - 1/2 x 1/4" Pipe - Drain Valve.
11	402-27	2	Mount, Rubber - Generator.
12	402A68	1	Pin, Engine Mounting - 4-3/8" long with 5/8-18 Thread.
	870-59	1	Nut, Castellated - 5/8-18 Thread.
13	402-10	1	Mount, Rubber - Upper.
14	402-11	1	Mount, Rubber - Lower.
15	402-12	1	Cup, Rubber Mount Retainer.
	(CO)C400B-229	2	Washer, Plain - 11/16, 3/32 thick - Lower Mounting Rubber.
	(CO)X-4584	1	Stud, 5/8-18 x 4-3/8 long (Drilled) - Gear Cover to Front Motor Support.
	(CO)X-18066	1	Nut, 5/8-18 x 5/8 high (Slotted) - Gear Cover to Front Motor Support.
	(CO)X 14191	2	Washer, Plain - 5/8 x 2-1/4 x 1/8 - Gear Cover to Upper Mount.
	(CO)X-607	1	Pin, Cotter - 1/8 x 1-1/2 long - Gear Cover to Front Motor Support Stud.
	(CO)F162E-5011	1	▲Manifold, Engine Exhaust - Water Cooled.
	504-19	1	▲Valve, Water - Lockshield.
	504-20	1	▲Key, Water Valve.
	307-182	1	▲Valve, Water - Solenoid 12 Volt.
	110A528	1	▲Bracket, Manifold Water Pipe.
	504-11	1	▲Valve, Water By-Pass Regulator.
	110A522	2	▲Plug, Adapter - (1) Water Pump Hose, (1) Water Outlet Hose.
	309-29	1	*Thermostat.
	333A12	1	*Thermostat Box.
	333A13	1	*Thermostat Box Cover.
	333P54	1	*Heater, Water Jacket (Tank Type, 110 Volt, 850W).

▲ - These optional parts are used only with certain plants which are adapted to cooling by passing fresh water (city water) through the engine as necessary when ventilation is inadequate. Pipe fittings, hoses and clamps which are usually available locally are not listed. Consult your dealer if conversion to City Water Cooling is desired.

\* - Optional Equipment

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 19 - BATTERY CHARGING GENERATOR GROUP			
1	191P8	1	Generator, Battery Charging (Does not include pulley) Autolite, 12 volt.
1A	191C315	1	Spec A Only.
	191P11	1	Begin Spec B.
2	191A317	1	Pulley, For Charging Generator.
	185-805	1	Spec A Only.
3	232A230	1	Begin Spec B.
4	232A234	1	Bracket, Generator Mounting - (CO)F400M-301.
5	191-21	1	Arm, Generator Belt Adjusting.
	191B316	1	Spacer, Generator Mounting.
6	331A29	1	Regulator, Charge - 12-Volt.
7	416A77	1	Spec A Only.
8	416A49	1	Begin Spec B.
9	416B407	1	Clamp, Pipe - Mounting Hand Crank.
10	416B406	1	Cable, Battery - 28" long.
11	520A435	2	Cable, Battery - 14" long.
	192B4	1	†Tray, Battery.
(CO)X-19002		5	†Frame, Hold Down.
(CO)X-1802-G		5	Stud, Battery Hold Down.
850-51		5	Crank, Engine Hand.
(AL)GJC-2012AS	191-16	1	Stud - 3/8-16 x 101/4" - Charging Generator Bracket to Crankcase.
	(AL)GBW-45	2	Nut - 3/8-16 - Charging Generator Bracket to Crankcase.
(AL)GJC-42		2	Lockwasher - 3/8 - Charging Generator Bracket to Crankcase (CO)X-203.
312A15		1	Brush Set, Charging Generator.
(AL)GJC-42	191-16	1	Spec A Only
	(AL)GJC-2012AS	1	Begin Spec B
(AL)GBW-45	(AL)GBW-45	2	Spring, Brush, Charging Generator.
	(AL)GJC-42	2	Spec A Only
312A15		1	Begin Spec B
		1	Condenser, 0.1 Mfd.. Voltage Regulator Suppression

† - Note: - On Plants With Optional Water Cooled Manifolds, Use Tray #416C427 and Frame #416B338.

## PARTS LIST

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 20 - HOUSING GROUP (HOUSED PLANTS ONLY)			
1	403D476	1	Chassis, Mounting.
2	403D477	1	Chassis, Mounting - Rear Section.
3	405D1079	1	Panel, Front.
4	405D1080	1	Panel, Rear Door - Includes hinge.
5	405D1081	1	Panel, Rear End - Excludes door.
6	405D1082	1	Panel, Top.
7	405D1084	2	Panel, Side Door - Includes Hold Down Fasteners.
8	130B396	1	Bracket, Radiator - Mounting Support.
9	130B397	2	Bracket, Radiator.
10	232B1345	2	Spacer, Generator Mounting.
11	130C402	1	Guard, Fan - 1 Piece (Replaces 2 piece guards used previously).
12	403A373	1	Plate, Chassis - 9-1/2 x 9" - For Mounting Load Wire Conduit.
13	406-2	1	Knob, Panel Door - Attach with Machine Screw.
14	336A476	1	Cable, Ground Strap.
15	405A1181	2	Stop, Door.
FIG. 21 - MOUNTING GROUP (UNHOUSED PLANTS ONLY)			
1	403D476	1	Chassis, Mounting.
2	403C478	1	Trim, Chassis - Right Hand Side.
3	403C479	1	Trim, Chassis - Left Hand Side.
4	405D1079	1	Panel, Front End.
5	405D1089	1	Trim, Front Panel.
6	130B396	1	Support, Radiator Mounting.
7	130A397	2	Bracket, Radiator.
8	232B1345	2	Spacer, Generator Mounting - Spec "A" Models only.
9	403C507	1	Cover, Chassis Front (For units with City Water Cooling).
11	130C402	1	Guard, Fan - 1 Piece (Replaces 2 Piece Guards used previously).
12	336A476	1	Cable, Ground Strap.
FIG. 22 - ELECTRICAL CONTROL GROUP (HOUSED ONLY)			
1	301D1560	1	Box, Control.
2	301C1551	1	Panel, Control Box Upper - Use with 120/240 Volt, Single Phase Units.
3	301C1554	1	Panel, Control Box Upper - Use with 120 Volt Units.
4	301C1555	1	Panel, Control Box Upper - Use with 240 and 120/208 Volt Units.



REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 22 - ELECTRICAL CONTROL GROUP (HOUSED ONLY) (Cont.)			
5	301C1550	1	Panel, Control Box Upper - Use with 120/240 Volt, 3 Phase Units.
5	301C1561	1	Panel, Control Box Upper - Use with 460, 220/380, and 277/480 Volt Units.
5A	301C1696	1	Panel, Control Box Upper - Use with 120/240 volt units - For X-ray Models only.
6			Voltmeter.
	302P420	1	0-150 Volt.
	302P421	1	0-300 Volt.
	302P422	1	0-500 Volt.
	302P423	1	0-750 Volt.
9	302-212	1	Meter, Running Time - 60 Cycle (Replaces #302-68).
10	302-102	1	Meter, Running Time - 50 Cycle.
11	302-157	1	Meter, Multiplier - 58,000 Ohms.
12	302A235	As Req.	Clamp, Current Transformer.
13	302A236	As Req.	Clamp, Current Transformer.
14	308-22	1	Switch, Selector.
15	322-26	1	Lamp, Panel.
16	322P49	1	Receptacle, Panel Lamp.
17	332-419	1	Block, Terminal - 6-1/4" long.
18	332A436	1	Marker, Terminal Block - Marked M1, M2, M3, M0.
19	332A437	1	Marker, Terminal Block - Marked M1, M3, M2, M4.
20	332A440	1	Jumper, Brass.
21	338C187	1	Harness Assembly, Wire.
22	508P63	1	Grommet.
23	▲		Ammeter, AC.
24	▲		Breaker, Circuit.
25	▲		Transformer, Current.
26	▲		Condenser.
27	▲		Resistor.
28	402-70	4	Mounts, Rubber.
29	337A44	1	Strap, Ground.
30	302B448	1	Plate, Meter Face - For appearance only - to give round meter a square look.
31	302-213	1	Frequency Meter - For X-ray Models only.

▲ - See Parts Table. For any parts not listed here refer to wiring diagram furnished with unit.

## PARTS LIST

## PARTS TABLE

MODEL	VOLTAGE	REF. NO. 23 AC AMMETER	REF. NO. 24 CIRCUIT BREAKER	REF. NO. 25 CURRENT TRANSFORMER	REF. NO. 26 CONDENSER	REF. NO. 27 RESISTOR
10HC-1R	120	302P403	320B52	302B78	312A58	
3R	120/240	302P419	320B52		312A58	
4R	120 208	302P405	325K2	302B117	312A58	*304-99
5R	240	302P405	325K2	302B117	312A58	*304-99
5DR	120/240	302P405	320B20	302B117	312A58	
6R	460	302-144	320-150	302B145	312A22	▲304-125
7R	220/380	302-159	320-150	302B160	312A22	*304-99
4XR	277/480	302-144	320-150	302B145	312A22	304A125
3R17	120/240	302P403	320P148	302B76	312A58	
12HC-53R	120/240	302P406	320-21	302B76	312A58	
54R	120/208	302P405	320B52	302B117	312A58	*304-99
55R	240	302P405	320-153	302B117	312A58	*304-99
55DR	120/240	302P405	320-153	302B117	312A58	
57R	220, 380	302P404	320-152	302B123	312A22	*304-99
15HC-1R	120	302P410	320P148	302B79	312A58	
3R	120/240	302P406	320P148	302B76	312A58	
4R	120/208	302P406	320B21	302B76	312A58	*304-99
5R	240	302P405	320B52	302B117	312A58	*304-99
5DR	120/240	302P405	320B52	302B117	312A58	
6R	460	302P404	320-151	302B123	312A22	▲304-125
7R	220/380	302P404	320-152	302B123	312A22	*304-99
4XR	277/480	302P404	320-151	302B123	312A22	304A125

\* - 5,000 Ohm - 10 Watt Resistor.

▲ - 15,000 Ohm - 25 Watt Resistor.

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
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FIG. 23 - ELECTRICAL CONTROL GROUP (UNHOUSED ONLY)

Note: For Unhoused Units With Optional Meterpanel, See Housed Electrical Control Group for parts not listed in this Group.

1	301D1560	1	Box, Control.
2	301C1195	1	Panel, Control Box.
3	301C1845	1	Bracket, Mounting - Control Box - Single Piece (Replaces two piece bracket).
4	508P63	1	Grommet - For 2-3/4" Hole (Use with single piece control mounting bracket).
5	312A15	As Req.	Condenser - 0.1 Mfd. - Use with 120, 120/240, and 120/208 Volt Units.
6	312A22	As Req.	Condenser - 0.1 Mfd. - Use with 460 Volt Units.
7	312A58	As Req.	Condenser - 0.1 Mfd. - Use with 240, and 220/380 Volt Units.
8	332A419	1	Block, Terminal - 6-1/4" long.
9	332A436	1	Marker, Terminal Block - Marked M1, M2, M3, M0.
10	332A437	1	Marker, Terminal Block - Marked M1, M3, M2, M4.
11	332A440	2	Jumper - Brass.
12	338C187	1	Harness Assembly, Wire (Replaces #338C188).

FIG. 24 - ENGINE CONTROL GROUP (HOUSED AND UNHOUSED)

1	301D1560	1	Box, Control.
2			Panel, Control Box - Lower.
	301C1152	1	Spec A Only.
	301C1916	1	Begin Spec B.
3			Gauge, Oil Pressure.
	193B97	1	Spec A Only.
	193B107	1	Begin Spec B.
4			Gauge, Water Temperature.
	193B99	1	Spec A Only.
	193B106	1	Begin Spec B.
5			Ammeter, Charge.
	302-60	1	20-0-20, Spec A Only.
	302-61	1	30-0-30, Begin Spec B.
6	304-32	1	Resistor - 15 Ohm - 10 Watt.
7	307B4	1	Relay, Stop.

## PARTS LIST

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 24 - ENGINE CONTROL GROUP (HOUSED AND UNHOUSED) (Cont.)			
8	307B52	1	Relay, Start Disconnect.
9	307B81	1	Relay, Choke.
10	307B81	1	Relay, Start Ignition.
11	308-5	1	Switch, Hand Crank - Remote (Replaces #308-6).
12	308-90	1	Switch, Start-Stop - Spec A Only - Use 308A166 Switch Assy.
12A	308P154	1	Switch, Start-Stop - Begin Spec "B".
13	301A974	1	Bracket, Mounting - Use with 308-90 Switch only.
14			Block, Terminal.
	332A391		3-7/32", 20A - Spec A Only.
	332A537		2-1/2", 20 A - Begin Spec B.
15			Marker Strip
	332A447		3-7/32", B -3-Spec A Only.
	332A566		2-1/2", B -3-Begin Spec B.
16			Block, Terminal - 6-1/4" long.
	332A503	1	5-15/32", 30A - Spec A Only.
	332A607	1	6", 20A - Begin Spec B.
17			Marker Strip
	332A510	1	5-15/32", 4-11-Spec A Only.
	332A608	1	6", 4-15-Begin Spec B.
18	517-19	1	Button, Dot.

FIG. 25 - GENERATOR GROUP

1	*	1	Armature - Includes Ball Bearing and Drive Disk.
2	*	1	Frame - Machined and Drilled.
3	*	1	Coil Set, Field - Set of 4 Connected.
4	*	4	Shoe, Pole.

\* - Refer to factory giving Model and Serial Number.

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
5	*	1	Rig Assembly, Brush - Includes Brushes and Springs.
6	205B33	1	Blower, Armature.
7	211D91	1	Bell, End.
8	212A1106	4	Spring, Commutator Brush.
9	212A1120	4	Block, Holder - Collector Ring Brush.
10	212A1121	4	Guide, Commutator Brush.
11	212A1123	As Req.	Spring, Collector Ring.
12	212A1138	1	Spider, Brush Rig Mounting.
13	213B116	1	Ring, Insulator - Brush Guide.
14	214A54	As Req.	Brush, Collector Ring.
15	214A57	4	Brush, Commutator.
16	231D95	1	Adapter, Generator (Replaces #231D64).
17	232B1116	1	Screen, Generator Air Outlet.
18	232A601	1	Cover, Bearing.
19	232A615	1	Clip, Bearing Stop.
20	232B814	3	Cover, End Bell Opening - Top and Sides.
21	232B841	1	Cover, End Bell Opening - Bottom.
22	312A17	1	Condenser, 0.5 Mfd. - 10 HC Only.
23	510A52	1	Bearing, Armature Ball.
24	101A298	1	Cover, Starter Hole - On Generator Adapter.

\* - Refer to factory giving Model and Serial Number.

## PARTS LIST

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 26 - CITY WATER COOLING GROUP (OPTIONAL EQUIPMENT)			
NOTE: Requires one 7/32" hole in valve plate of thermostat.			
1	154E504	1	Manifold, Water Cooled.
2	503-189	8	Clamp, Hose.
3	Describe	As Req.	Hose, 3/4 id x 9" (503P191 bulk).
4	Describe	As Req.	Hose, 3/4 id x 6" (503P191 bulk).
5	503A3	2	Hose 1-1/2 x 1-7/8 O.D. x 2-1/2 Long
6	503P129	4	Clamp, Hose (Also in Cooling System Group).
7	505-100	14	Nipple, 1/2 x 1-1/8.
8	307P182	1	Solenoid, 12 V. (Also in Cooling System Group).
9	110A526	1	Nipple and Bracket Assembly.
10	504-19	1	Valve, Lockshield (Also in Cooling System Group).
11	504-20	1	Key, Valve (Also in Cooling System Group).
12	505-40	5	Elbow, 1/2.
13	518A29	1	Ring, Key.
14	880-47	1	Chain, 6" of 2/0.
15	504-11	1	Valve, Water Regulator (Also in Cooling System Group).
16	505-80	1	Pipe, 1/2 x 6" Long.
17	505-300	1	Nipple, 1/2 x 21.
18	505-78	1	Nipple, 1/2 x 2-1/2.
19	110A528	1	Bracket, Manifold Water Pipe (Also in Cooling System Group).
20	505-108	2	Tee, 1/2.
21	110A522	2	Adapter (Also in Cooling System Group).
22	505-18	1	Bushing Reducer 1/2 - 1/4 (Also in Cooling System Group).
23	504-3	2	Cock, Drain (Also in Cooling System Group).
24	505-190	2	45° Elbow 1/2
25	505A185	2	Half Nipple 1/2.
26	504-28	1	Drain Cock 3/8.
27	505-172	1	Close Nipple 2".
28	505-183	1	Elbow Reducer 2 x 1-1/2.
29	520A573	3	*Stud, Manifold.

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 26 - CITY WATER COOLING GROUP (Cont.)			
30	520A574	2	*Stud, Manifold.
31	416C427	1	*Tray, Battery (Also in Cooling System Group).
32	154A525	1	*Backplate, Nipple and Bracket Assembly.
33	154A523	1	Cover Plate, Manifold.
34	154A524	1	Flange, Manifold Water Outlet.
35	154A502	1	Flange, Manifold Exhaust.
36	154A503	1	Plate, Manifold End.
37	403C507	1	*Cover, Front Chassis.
38	154A531	1	Gasket, Exhaust Flange.
39	130C485	1	*Belt Guard
40	154A529	2	Gasket, Water Outlet.
41	154A530	1	Gasket, End Plate.
42	154-C18	1	*Adapter, Carburetor.
43	145A178	1	*Gasket, Carburetor Adapter.
45	110-580	2	*Screw, 3/8 - 16 x 1-1/8.
46	405D1132	1	*Top Panel (Replaces 405D1082).
47	505-95	1	*Nipple, 1-1/2 x 12" Pipe.
48	505-32	1	*Coupling, 1-1/2 Pipe.
49	416B338	1	*Battery Holdown.
50	800-28	8	Capscrew 5/16 x 1 (Top Plate).
51	800-50	4	Capscrew, 3/8 x 1 (Back Plate).
52	(CO) F400E-303	1	Gasket, Manifold.
53	526-65	8	Washer 5/16 (Copper).
54	526-66	8	Washer 3/8 (Copper).
55	800-53	4	Capscrew 3/8 x 1-3/4.

\* - These items not shown on drawing;

Items 32, 37 and 39 open units only;

Items 46, 47, and 48 housed units only.

## PARTS LIST

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
SERVICE KITS & MISCELLANEOUS			
185-825		1	*Kit, Connecting Rod Bearing - Complete Engine - Standard - (CO)F400T-152.
185-824		1	*Kit, Crankshaft Bearing - Complete Engine - Standard - (CO)F400T-151.
185-820		1	*Kit, Piston Ring - For Re-Ring, Expander Type - Standard Size, 4 Piston - (CO)F162T-152C.
(CO)F162T-153C		1	*Kit, Piston Ring - For Re-Bore - Standard Size, 4 Piston.
(CO)F600T-293		1	Kit, Oil Pump Repair Parts.
(CO)F162U-119		1	Kit, Engine Gasket - For Basic Engine Only - See Onan #168K58 for Complete Plant.
(CO)F400T-253		1	Kit, Water Pump Repair Parts - For Pump (CO)F400K-3941 and (CO)F400K-3947.
(CO)F162U-109		1	Gasket Kit, Valve Grind.
(CO)F400T-181		1	Kit, Camshaft Bushing - (Finished Reamed) - Complete for Engine.
(CO)F400T-314		1	Kit, Valve Tappet - (Complete for Engine - 8 pcs.).
(CO)F600T-293		1	Kit, Oil Pump Repair.
143K60		1	Kit, Carburetor Gasket.
143K65		1	Kit, Carburetor Repair Parts.
149K508		1	Kit, Fuel Pump Repair Parts.
168K58		1	Kit, Gasket - Complete Plant.
522K168		1	Kit, Overhaul - 12 Volt Cranked Plants - Battery Ignition.
524-73		1	STA-BIL, Gasoline Additive. -
524-74		1	4 Ounce Can.
524-75		1	16 Ounce Can.
			32 Ounce Can.
525P90		1	Paint, Touch-up Enamel. -
525P137		1	Mouse Gray, 12 Ounce Pressurized Can.
			Green, 16 Ounce Pressurized Can.

\* - Refer to "Oversize and Undersize" Chart.



# **SPECIAL SECTION**

## **FOR**

### **PENNSYLVANIA APPROVED STANDBY GENERATING PLANTS**

THIS SECTION IS DESIGNED TO SUPPLEMENT THE MAIN, ILLUSTRATED SECTION. IT IS, THEREFORE, TO BE USED WITH, NOT MERELY IN PLACE OF, THE MAIN SECTION. CONSULT THIS SECTION BEFORE REFERRING TO THE MAIN PARTS LISTING.



## PARTS LIST

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
NOTE: USE THESE PARTS IN PLACE OF OR IN ADDITION TO PARTS LISTED IN THE MAIN, ILLUSTRATED SECTION.			
SUPPLEMENT TO FIG. 12 - FUEL SYSTEM GROUP (Gas Only)			
149P558		1	Strainer, L.P.G. Fuel Pipeline (3/4" Pipe size).
307P312		1	Valve, Gas Solenoid (3/4", 12 Volt).
SUPPLEMENT TO FIG. 15 - SEPARATE FUEL TANK GROUP			
415K3		1	Tank and Fittings (Includes Parts Marked ☆).
415-43		1	☆Cap, Fill Pipe.
415-44		1	☆Cap, Vent Pipe.
415-140		1	☆Tube, Suction.
415A166		1	☆Tank, Fuel (55 Gallon).
Describe		As Req.	Common Hardware and Plumbing Not Supplied.
415K45		2	Line and Fittings (Includes Parts Marked †).
502-117		1	†Elbow, Compression (W/ Nut and Sleeve).
502-118		1	†Connector
Describe		As Req.	†Tubing, 3/8" x 25' Copper.
SUPPLEMENT TO FIG. 16 - WATER AND OIL SENDER GROUP			
Note: Switch, Hi-temperature Cut-off Not Standard Equipment On PENNSYLVANIA APPROVED GENERATING PLANTS			
SUPPLEMENT TO FIG. 19 - BATTERY CHARGING GENERATOR GROUP			
416P325		1	Hydrometer.

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
NOTE: USE THESE PARTS IN PLACE OF OR IN ADDITION TO PARTS LISTED IN THE MAIN, ILLUSTRATED SECTION.			
SUPPLEMENT TO FIG. 22 - ELECTRICAL CONTROL GROUP (Housed)			
301C1602		1	Panel, Upper Control - Use With 240 and 120/208 Volt Units.
301C1744		1	Panel, Upper Control - Use With 115/230 Volt Units.
Note: Circuit Breakers Not Standard Equipment On PENNSYLVANIA APPROVED GENERATING PLANTS.			
SUPPLEMENT TO FIG. 24 - ENGINE CONTROL GROUP ( Housed and Unhoused)			
301A993		1	Guard, Switch.





